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NASA Technical Memorandum 81871  
AVRADCOM TECHNICAL MEMORANDUM 80-B-2

NASA-TM-81871 19800024840

A FLIGHT INVESTIGATION OF PERFORMANCE  
AND LOADS FOR A HELICOPTER WITH  
10-64C MAIN-ROTOR BLADE SECTIONS

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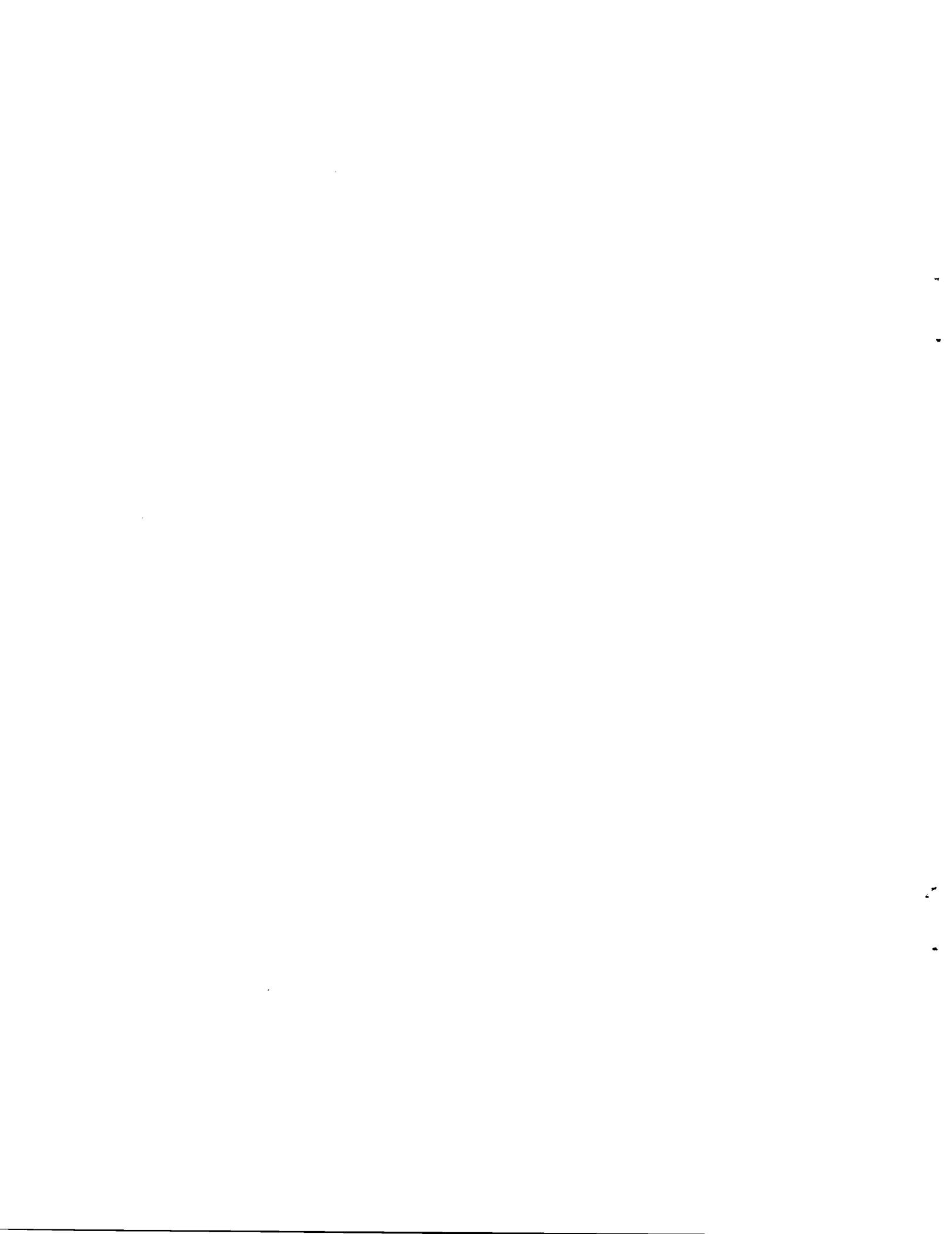
OCT 23 1980

October 1980

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# A FLIGHT INVESTIGATION OF PERFORMANCE AND LOADS FOR A HELICOPTER WITH 10-64C MAIN-ROTOR BLADE SECTIONS

By

Charles E. K. Morris, Jr., Robert L. Tomaine,  
and Dariene D. Stevens

## SUMMARY

A flight investigation has obtained performance and rotor-loads data for a teetering-rotor, AH-1G helicopter flown with the 10-64C airfoil as the main-rotor blade section. Data for each test point describe flight-state parameters, control positions, rotor loads, power required, and blade motion. The flight program included forward flight up to 83 m/sec (162 knots), hover, linear climb and descent, descending turns, and symmetrical pull-ups.

Rotor loads are reviewed in terms of peak-to-peak values and harmonic content. Increased airspeed produced increased peak-to-peak loads at tip-speed ratios above 0.2. Peak-to-peak loads exhibited basic trends for increased maneuver load factor: inboard chordwise loads increased significantly, torsional loads decreased, and midspan beamwise loads remained virtually unchanged. Harmonic analysis showed that the trends for the larger harmonic components were consistent with trends exhibited by the peak-to-peak data for each respective type of load.

## INTRODUCTION

Studies have indicated that improvements in rotorcraft airfoil characteristics can contribute significantly to improvements in the performance and loads characteristics of helicopter rotors. The aerodynamic design of these airfoils is still accomplished with design methods constrained to two-dimensional, steady flow (ref. 1). Efforts to relate airfoil design methods to the complex flow environment of the helicopter rotor lead to full-scale tests. Flight tests have been conducted for this purpose; they were accomplished with three sets of dynamically similar blades with the same twist and planform. Each of the three sets of blades was built with a different airfoil, designed by a significantly different method. The tests and some of the results have been documented in references 2, 3, and 4. Flight tests with the standard, production main-rotor blades are described in reference 5.

This report presents flight data on loads and performance for one blade set of the investigation of reference 2. The data were obtained with instrumented main-rotor blades having the 10-64C airfoil of reference 6. The data systems (described in ref. 3, 4, 5, and 7) produced records of flight-state parameters, control positions, engine performance, rotor loads, blade angles, blade pressure distributions, and other data. Test conditions included steady, level flight up to 83.2 m/sec (162 knots) and collective-fixed turns, pull-ups, climbs, and descents at a tip-speed ratio of approximately 0.25.

N80-33348 #

Numerous sets of reduced data are presented with minimal analysis. Each set contains concurrently measured values of all of the performance and loads parameters. Figures illustrating trends or typical parameter histories are given to assist in the interpretation and utilization of the data listings.

## SYMBOLS

Positive senses of some axes, angles, and accelerations are presented in figure 1.

$A_{0f}$	main-rotor collective pitch angle at 0.75R, commanded at swashplate, deg
$A_{0s}$	main-rotor collective pitch angle at 0.75R, measured at blade grips, deg
$A_0, tr$	tail-rotor collective pitch angle, deg
$A_{1f}$	main-rotor lateral-cyclic pitch angle, commanded at swashplate, deg
$A_{1s}$	main-rotor lateral-cyclic pitch angle, measured at blade grip, deg
$a$	speed of sound, m/sec
$a_{1s}$	first harmonic of main-rotor longitudinal flapping with respect to the rotor mast, deg
$B_{1f}$	main-rotor longitudinal-cyclic pitch angle, commanded at swashplate, deg
$B_{1s}$	main-rotor longitudinal-cyclic pitch angle, measured at blade grip, deg
$b_{1s}$	first harmonic of main-rotor lateral flapping with respect to the rotor mast, deg
$C_L'$	vehicle load coefficient, $\frac{Wn_z}{\rho\pi R^2(\Omega R)^2}$
$C_Q$	main-rotor-mast torque (power) coefficient, $\frac{Q}{\rho\pi R^3(\Omega R)^2}$
$c$	airfoil chord, m
$F_{db}$	drag-brace force, positive for tension, N
$F_{pl}$	pitch-link load, positive for compression, N
$g$	acceleration due to gravity, 9.81 m/sec <sup>2</sup>
$h_p$	density altitude, m

$i_h$	horizontal-tail incidence angle, deg
$M_{bp}$	blade beamwise (flapwise) bending moment at "p" percent blade radius, positive for load applied upward, N-m
$M_{cp}$	blade chordwise (inplane) bending moment at "p" percent blade radius, positive for load applied rearward toward blade trailing edge, N-m
$M_h$	reference blade-tip Mach number, $\frac{\Omega R}{a}$
$M_{tp}$	blade torsional moment at "p" percent blade radius, positive for load applied upward at blade leading edge, N-m
$m_1$	data channel sensitivity, measured units/mV
$n_x, n_y, n_z$	orthogonal set of load factors for aircraft center of gravity, g units
$p_f, q_f, r_f$	orthogonal set of fuselage angular rates, rad/sec
$Q$	main-rotor mast torque, N-m
$r$	radial distance to blade element, m
$R$	main-rotor radius, m
$T_b$	blade temperature, C
$T_{ce}$	canister electronics temperature, C
$t$	time, seconds
$V$	aircraft true airspeed or velocity, m/sec (knots)
$W$	aircraft gross weight, N
$X, Y, Z$	orthogonal set of aircraft body axes (see fig. 1)
$x$	airfoil abscissa, positive rearward from leading edge, m
$y$	airfoil ordinate, positive upward, m
$\alpha_f$	fuselage angle of attack, deg
$\beta_f$	fuselage angle of side-slip, deg
$\beta_s$	main-rotor, shaft-axis teeter angle, (where $\beta_s = a_0 - a_{1s} \cos\psi - b_{1s} \sin\psi \dots$ ) positive upward, deg
$\Delta f$	change in data measurement due to temperature (see table IV)

$\Delta m_2$  sensitivity of digitizing electronics, mV/counts - c  
 $\Delta P_0$  data increment due to sensor temperature, data units/C  
 $\Delta V_0$  adjustment to data-channel sensitivity for electronics temperature, mV/C  
 $\delta$  digital data-system measurements, counts  
 $\theta_f$  fuselage pitch attitude, deg  
 $\theta_s$  main-rotor shaft-axis blade pitch at  $0.75R$ , (where  $\theta_s = A_0 - A_{1s} \cos\psi - B_{1s} \sin\psi \dots$ ), measured at blade grip, deg  
 $\mu$  tip-speed ratio,  $V/(\Omega R)$   
 $\rho$  mass density of air, kg/m<sup>3</sup>  
 $\phi_f$  fuselage roll attitude, deg  
 $\psi$  main-rotor blade azimuth angle, measured from downwind position in direction of rotor rotation, deg  
 $\Omega$  main-rotor rotational speed, rad/sec

Subscripts;

c camber line  
 l lower surface  
 u upper surface

Bars over symbols denote mean values; circumflex marks ( $\hat{}$ ) over symbols denote peak-to-peak amplitudes of oscillations for one rotor revolution.

## EQUIPMENT AND PROCEDURES

### Test Vehicle

The test vehicle was the modified AH-1G attack helicopter described in the drawings of figure 2, the photograph of figure 3, and the tabulated characteristics given in Table I. The salient features of this helicopter are the teetering-hub main rotor, the narrow fuselage, and the stub wings. This vehicle had the same basic configuration described in reference 3 except for the main-rotor blades. The new set of blades had the same structural design as the NLR-1T blades of reference 3. The most significant change from the NLR-1T blades was in the use of the 10-64C airfoil as the blade-section profile. Some minor differences in blade weight and torsional natural frequency were also observed.

## Airfoil

The 10-64C was designed with the methods described in reference 8. This approach employs the crestline method for predicting drag-divergence Mach numbers for an appropriate range of lift coefficients. The coordinates of the 10-64C were generated using the NACA equations for four and five-digit airfoils. The thickness distribution is that of an NACA 0010-64 (standard nose radius and maximum thickness at 40 percent chord). The camber is derived from an extrapolation of five-digit airfoil camber; maximum camber is located at 35 percent chord. Figure 4 presents geometric data for this shape; Table II contains the coordinates.

Aerodynamic characteristics of the 10-64C airfoil are given in reference 6, which presents data from tests conducted in the Langley 6- by 28-inch wind tunnel at Reynolds numbers close to those for flight. Drag-divergence Mach number was determined to be about 0.83 at zero-lift conditions and 0.72 at a normal-force coefficient of 0.6. Pitching-moment coefficients ranged from -0.015 to -0.020 at subcritical speed and moderate lift; maximum normal-force coefficient was found to be slightly below that of the NACA 0012 airfoil tested in the same facility.

## Data Systems

The Piloted Aircraft Data System (PADS) acquired data from fuselage-mounted sensors. The list of PADS channels and their characteristics is given in Table III. The PADS used pulse-code modulation (PCM) in the multiplexer-digitizer system; it had a 10-bit word, parity included, and a sampling rate of 80 times per channel per second. Other details of the system are given in Appendix A of reference 5.

Rotor data were processed onboard by the Special Rotor Blade Instrumentation (SRBI) system of reference 7. The list of measured loads, temperatures and angles is given in Table IV. The SRBI system used PCM with an 8-bit word, which had no parity; it sampled each channel 1000 times per second. All of the channels for loads and angles had a single-pole, constant-delay filter with 3-deci-bel attenuation frequency at 90 Hz. Reference 7 and Appendix B of reference 3 contain further information on this system. The only difference in the set of sensors used, compared to those of reference 4, was the use of a linear slide-type potentiometer to measure hub teeter angle.

## Data Reduction

Data reduction was conducted to produce complete sets of concurrent values of all performance and load parameters for each test point. Measured PADS data were corrected and reduced to final form as described in reference 5. PADS parameters change more slowly than SRBI parameters, which allows one set of reduced PADS data to remain valid for each complete revolution described by SRBI data. Some of the PADS parameters were used to reduce each set of SRBI data (for a complete rotor revolution inclusive of each PADS test-point time). Most of the reduced SRBI data are described by their harmonic content. All SRBI data were corrected for the effects of temperature and filter lag. Rotor

speed was calculated from SRBI azimuth data rather than PADS tachometer data.

### Flight-Test Procedures

Flight-tests conditions included hover, level forward flight, and collective-fixed maneuvers. Test points for steady, level-flight speed sweeps ranged from about 34 to 83 m/sec (65 to 162 knots) in approximately 5 m/sec (10 knot) increments; each point was held for several seconds. Maneuvers were flown with a target tip-speed ratio of 0.25 (approximately 108 knots) and collective pitch set for steady, level flight at that speed. These maneuvers were symmetrical pull-ups, and constant-airspeed descending turns. Linear climbs and descents were also flown with the same airspeed target. Emphasis was placed on obtaining a data set that would be useful for comparison with data for the other blade sets flown with this same vehicle (refs. 2 through 5). This required strictly controlled and standardized test procedures, close attention to rotor speed, and the control of configuration parameters (such as center of gravity).

### PRESENTATION OF RESULTS

Data on performance, rotor loads, flight state, and control positions are presented in figures 5 through 18 and in the listing of Appendix A. Table V is a guide to the listings. Flight numbers and run numbers are used to identify the test points for all listings and some figures. The data figures are presented as follows:

	<u>Figures</u>
Level flight	
Power-required data . . . . .	5
Three speed sweeps. . . . .	6
Typical data histories. . . . .	7
Loads: harmonic content and airspeed . . . . .	8, 9
Climb and descent. . . . .	10
Maneuvering flight	
Descending turns. . . . .	11 to 14
Symmetrical pull-ups. . . . .	15 to 17
Maneuver data trends, peak-to-peak loads. . . . .	18

### DISCUSSION

The discussion of data for the 10-64C blades is consistent with the approach taken in reference 3 with the NLR-1T data. Vehicle load-level is described in

terms of vertical load-factor or vehicle load-coefficient  $C_L'$ . Although  $C_L'$  approximates rotor-lift coefficient, it is actually a measure of the normal component of inertial load reacted by the rotor, stub wings, and other aerodynamic surfaces. As in reference 3, rotor loads are discussed in terms of three components: beamwise (flapwise), chordwise (inplane), and torsional (including pitch-link loads).

As in references 3 and 5, test-point times for data reduction were chosen after records of flight-state parameters, control position, rotor motion, and blade loads were reviewed. For level flight or steady maneuvers, test-point criteria required a trimmed condition; for symmetrical pull-ups (transient maneuvers) the criteria required that the body attitude match that of the vehicle in level flight at the same airspeed.

### Level Flight

Power-required (ie., torque-required) data are presented in figure 5 as the variation of main-rotor torque coefficient with tip-speed ratio for eight level-flight speed sweeps. (The sets of data are plotted with offset scales and are sequenced in ascending order of average reference Mach number and load coefficient). The value of maximum attainable tip-speed ratio was constrained by engine-power limitations.

The level-flight, speed-sweep data of figure 6 give results for three separate flights. Data trends with increasing values of tip-speed ratio show good agreement for the two flights at  $C_L' = 0.0044$ . Flight results at the higher value of vehicle load coefficient reflect the requirements for higher power, higher main-rotor collective pitch, and lower longitudinal flapping. At  $\mu = 0.2$  and above, the higher  $C_L'$  produces a slight reduction in peak-to-peak loads for inboard beamwise and both torsional stations. Several additional trends can be observed in the data of figure 6. Above  $\mu = 0.2$ , peak-to-peak values of all the measured loads clearly show an increase with increasing tip-speed ratio; also, mean values of the torsional loads become more negative with increasing tip-speed ratio.

Characteristics of rotor loads for level flight are also presented in the next three figures. Figure 7 presents typical load histories for several rotor revolutions and indicates that the data wave-forms are highly periodic. Most of the characteristics of rotor-load harmonic content, shown in figures 8 and 9, are expected on the basis of level-flight results from NLR-1T data (ref. 3). Figure 8 presents data for airspeeds between 74 and 162 knots. Beam-wise loads are composed primarily of the first four harmonics, with the first two harmonics predominating inboard. The most significant chordwise loads are typically first, third and sixth harmonics; fourth harmonic chordwise loads also become comparatively large at 80 percent span at higher speeds. Torsional loads change from primarily first harmonic at lower speeds to include a significant amount of second-harmonic component at higher speeds. A summary of some harmonic components of level-flight rotor loads, shown in figure 9, indicate that the more significant components typically increase in magnitude as tip-speed ratio (and airspeed) increase. All of these trends are consistent with those observed for the NLR-1T blades (ref. 3).

## Climb and Descent

Climb and descent data are presented in figure 10. Flight results show that increasing the rate of climb affects the main rotor by requiring more collective pitch, more forward tilt of the disk, and more power. Increasingly negative values of mean torsional loads are shown to be associated with increases in rate of climb.

## Maneuvers

Results for both left and right descending turns are given in figures 11 through 14. The highly periodic data of figure 11 illustrate that a descending turn can be treated as a quasi-steady test condition. A review of the oscillatory loads data shows that three types of trends are evident as normal-load factor is increased to that producing  $C_L' = 0.0078$ . All chordwise loads and the beamwise loads at 80 percent span increase; all other beamwise loads remain relatively unaffected; torsional loads decrease slightly.

Data for symmetrical pull-ups are presented in figures 15, 16, and 17. The variation of chordwise loads with time clearly illustrates the transient nature of the maneuver (fig. 15(b)). The harmonic-content data show the same trends of rotor loads with  $C_L'$  as for descending turns, although the chordwise loads do not appear to increase as consistently for turns.

The peak-to-peak loads data, shown in figure 18, can be used to develop a better understanding of the total set of maneuver loads data. (The vector summation of the harmonic components of any given load can be very significant to the resulting peak-to-peak loads). The previously observed trends for variations in magnitudes of harmonic loads with  $C_L'$  are generally consistent for trends shown in the data of figure 18. Increases in  $C_L'$  affect peak-to-peak loads by producing: virtually no change in most beamwise channels, moderate increases beamwise and chordwise at 80 percent span, large increases for inboard chord loads, and slight decreases for the torsional channels. These results are consistent with the trends exhibited by the more significant harmonic components of each respective type of load.

## CONCLUDING REMARKS

A flight investigation has been conducted to acquire data on the performance, loads and airfoil aerodynamics of a teetering-rotor helicopter having the 10-64C airfoil as the blade-section contour for the main-rotor. Data are presented on the variation of flight-state parameters, control positions, rotor loads, power required, and blade motion during level-flight speed sweeps, as well as maneuvers at approximately 0.25 tip-speed ratio.

Several trends are evident in the data. At tip-speed ratios above 0.2, peak-to-peak loads increase with increased airspeed. Peak-to-peak loads also display basic trends with increases in normal load factor for maneuvers: inboard chordwise loads increase significantly, torsional loads decrease, and the mid-span beamwise loads remain virtually unchanged. Harmonic analysis shows that

the most consistently significant components in level flight are the first four beamwise, the first two torsional and the first, third, and sixth chordwise. These larger harmonic components exhibit trends consistent with the previously cited trends for peak-to-peak maneuver loads.

## APPENDIX A

### TEST-POINT DATA LISTINGS

The upper part of the page for each test point contains PADS-PCM data from fuselage-mounted sensors. The information on test-point identification and data on flight state, control position, and other parameters are presented in the manner explained in reference 5.

The lower part of each page contains SRBI-system data on the rotor. Test-point identification is printed next to flight-condition parameters. Three temperatures are given: the value computed for ambient atmospheric conditions (AMB TEMP); blade temperature at 90 percent radius, upper surface, 60 percent chord (TEMP 60); and the temperature of the blade electronics in the canister (CAN TEMP). The latter two are listed in both Table IV and reference 7 as  $T_b$  and  $T_{ce}$ , respectively. These two temperatures were used in SRBI data reduction. The mast-torque coefficient printed is the average value for the revolution. The total torque coefficient is the value obtained for engine power at equivalent main-rotor rotational speed. Both blade pitch (at 75 percent radius) and teeter angle of the instrumented blade are described by conventional mean and cyclic components based on harmonic analysis. Peak-to-peak values are added since, as noted in reference 5, data traces may be much more complex than a simple first-harmonic pattern.

Rotor loads are presented in terms of mean values, peak-to-peak values, and the harmonic content for the first 12 harmonics of actual rotor rotational frequency. (The measured value of this frequency is also listed). The harmonic representation uses a series of cosine terms, each with a phase delay. Using labels from the listing, each load may be described as:

$$F(t) = (\text{MEAN}) + \sum_{n=1}^{\infty} (\text{AMP})_n \cos(t - (\text{PHASE})_n)$$

where  $F$  is the load (a function of time), MEAN is the mean amplitude,  $n$  is number of the harmonic, AMP is the vector amplitude, and PHASE is the phase angle in degrees for that harmonic.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 36364. N  
 RUN NO. 3 8175. LB  
 TIME 49784.40 (SEC)

LOADED CG X= 5.04 M = 108.4 IN  
 Y= -.01 = -.6  
 Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= .66 KPA = 13.9 PSF  
 STATIC PRES= 94.2 KPA = 1967. PSF  
 T. AIRSPEED= 66.6 KT TOTAL TEMP= 290.8 DEG K = 523.4 DFG R  
 A/C MACH NO= .100 STATIC TEMP= 290.2 DEG K = 522.3 DFG R  
 BODY ALPHA= -.2 DEG DENSITY= 1.13 KG/M3 = .00219 SLUG/FT3  
 BODY BETA= .8 DEG DENSITY ALT= 827. M = 2714. FT  
 SONIC SPEED= 342.1 M/SEC = 1122. FPS  
 RATE OF CLIMB= -22. M/MIN = -74. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DFG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	34.24	112.3	-0.030	34.24	112.3	-0.031	ROLL	-.1	-.005	.015
Y	.50	1.6	.005	.49	1.6	.008	PITCH	-.9	.001	.008
Z	-.15	-.5	-1.013	-.15	-.5	-1.013	YAW	319.3	-.001	.002

CONTROL ANGLES M.R. COLL= 8.3 DEG HORIZ FIN= 6.7 DFG  
 A1= -.5 DEG T.R. COLL= 1.2 DEG  
 B1= 2.2 DEG PEDAL POS= 1.5 DEG

ROTOR PARAMETERS SHAFT ALPHA= -.2 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -2.4 DFG  
 TIP MAX-MACH= .77 DELTA PSI= -.8 DEG  
 TIP MIN-MACH= .57  
 .9R MAX-MACH= .70 ENGINE POWER= 340. KW = 456. HP  
 .9R MIN-MACH= .50 THRUST FACTOR= .833E+07 N = .187E+07 LP

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 75 MU= .150 TOTAL CO= .000179 AMB TFMP= 17.0 C = 62.67 F  
 V= 66.6 KT MAST CO= .000163 TFMP UAO= 34.3 C = 93.75 F  
 RUN NO. 3 NZ= 1.013 G OMEGA= 34.054 RAD/SEC CAN TEMP= 31.9 C = 89.47 F  
 TIME 49784.27 CLP= .00442 RPM/324= 1.004

ROTOR ANGLES THETA 3/4 (DEG) A0= 6.5 A1= -1.2 B1= 2.1 PEAK-TO-PEAK= 4.8  
 TEETER ANG (DEG) A0= .1 A1= -.3 B1= .3 PEAK-TO-PEAK= .8

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DFG) (N-M/DEG)

MEAN	46112.	-292.	-3257.	-1907.	-355.
HARMONIC-1	4254. / .8	1036. / -4.8	179. / -6.2	1188. / -1.5	161. / -46.2
2	58. / -3.2	126. / 4.4	62. / -18.4	44. / 22.5	40. / 32.1
3	296. / -70.0	88. / 55.8	44. / -19.1	265. / 33.6	54. / -75.9
4	264. / 67.4	175. / 31.6	65. / 36.6	92. / 51.9	28. / 46.8
5	213. / 65.4	61. / -66.8	23. / 30.2	123. / -5.0	2. / -77.3
6	418. / -84.8	185. / 75.6	64. / 72.4	124. / -55.0	22. / -47.1
7	203. / -93.4	103. / -66.8	32. / -45.2	53. / -76.2	4. / 55.9
8	79. / 55.0	86. / -70.5	31. / -84.4	43. / 86.8	5. / -2.5
9	143. / 75.2	84. / 78.4	34. / 57.7	22. / 51.5	3. / -.7
10	28. / -68.9	39. / 69.1	26. / 48.5	157. / -8.9	20. / 36.6
11	89. / -64.3	67. / -9.1	16. / -5.6	72. / 29.1	11. / 15.1
12	43. / -43.1	20. / -58.1	7. / -83.0	32. / 14.8	5. / 73.5
PEAK-TO-PEAK	10020.	2657.	638.	3403.	477.

BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DFG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
---------------------	---------------------	---------------------	---------------------	---------------------

MEAN	-2080.	-184.	-228.	-505.	-503.
HARMONIC-1	344. / -29.2	191. / -79.7	209. / -80.7	200. / -69.5	81. / -76.4
2	153. / 7.4	127. / -9.5	154. / -6.7	714. / -6.4	123. / -17.8
3	100. / 2.4	13. / 15.6	12. / -25.2	65. / -27.4	140. / -7.8
4	140. / 31.2	51. / 20.5	39. / 26.3	29. / 46.7	53. / 50.7
5	126. / 5.0	8. / 58.2	20. / -12.3	29. / 15.4	42. / 1.0
6	25. / 63.6	10. / 33.9	13. / -15.8	20. / 30.7	35. / -46.4
7	56. / -73.2	10. / -35.7	28. / -66.5	20. / 44.4	56. / 88.5
8	54. / 73.3	13. / 89.9	21. / 62.8	11. / -38.1	22. / 18.5
9	9. / 46.6	7. / 40.9	8. / 38.9	10. / 80.5	16. / -79.1
10	88. / -40.5	40. / -36.5	23. / -65.9	34. / -26.6	27. / -12.4
11	28. / 20.6	22. / 14.9	7. / -55.5	15. / 17.0	8. / 20.5
12	14. / 45.4	7. / 44.3	4. / 30.2	6. / 53.6	4. / 85.2
PEAK-TO-PEAK	1525.	581.	631.	840.	800.

## NASA LANGLEY FLIGHT DATA AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 36307. N  
 RUN NO. 4 8162. LB  
 TIME 49865.30 (SEC)

LOADED CG X= 5.04 M = 198.4 FT  
 Y= -.01 \* -.6  
 Z= 1.83 \* 71.9

## AERODYNAMIC FLIGHT STATE

T. AIRSPEED= 75.6 KT  
 A/C MACH NO= .114  
 BODY ALPHA= -.9 DEG  
 BODY BETA= -1.1 DEG

DYNAMIC PRES= .86 KPA = 17.9 PSF  
 STATIC PRES= 94.3 KPA = 1970. PSF  
 TOTAL TEMP= 290.9 DEG K = 523.7 DEG R  
 STATIC TEMP= 290.2 DEG K = 522.3 DEG R

DENSITY= 1.13 KG/M3 = .00220 SLUG/FT3  
 DENSITY ALT= 811. M = 2662. FT  
 SONIC SPEED= 342.1 M/SEC = 1122. FPS  
 RATE OF CLIMB= -23. M/MIN = -75. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	38.85	127.5	-0.035	38.84	127.4	-0.039	ROLL	-1.1	-0.005	-.011
Y	-.72	-2.3	.011	-.72	-2.4	.009	PITCH	-1.5	.007	.018
Z	-.62	-2.0	-1.026	-.62	-2.0	-1.026	YAW	312.6	-.006	.004

CONTROL ANGLES

M.R. COLL=	8.5 DEG	HORIZ FIN=	6.8 DEG
A1=	-.4 DEG	T.R. COLL=	.9 DEG
B1=	2.5 DEG	PEDAL POS=	1.2 DEG

## ROTOR PARAMETERS

HOVER TIP MACH= .67	SHAFT ALPHA= -.9 DEG
	CONTROLC ALPHA= -3.4 DEG
TIP MAX-MACH= .78	DELTA PSI= 1.1 DEG
TIP MIN-MACH= .55	
.9R MAX-MACH= .72	ENGINE POWER= 347. KW = 465. HP
.9R MIN-MACH= .49	THRUST FACTOR= .835E+07 N = .188E+07 LB

## NASA LANGLEY FLIGHT DATA AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .170	TOTAL CO= .000182	AMB TEMP= 17.0 C = 62.65 F		
RUN NO.	V= 75.6 KT	MAST CO= .000166	TEMP U60= 34.3 C = 93.75 F		
TIME	NZ= 1.026 G	OMEGA= 34.036 RAD/SEC	CAN TEMP= 31.5 C = 88.78 F		
CLP= .00447	RPM/324= 1.003				
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 6.7	A1= -1.2	B1= 2.5	PEAK-TO-PEAK= 5.8
	TEETER ANG (DEG)	A0= .1	A1= -.5	B1= .2	PFAK-TO-PFAK= 1.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	45992.	-198.	-3231.	-2000.	-370.
HARMONIC-1	4165./ .9	989./ -2.7	168./ -5.6	1393./ -10.8	192./ -45.6
2	325./ -65.7	150./ 40.8	39./ 11.2	438./ 9.0	37./ 10.8
3	504./ 20.6	160./ 24.8	18./ 6.0	303./ 21.8	53./ -80.9
4	199./ -74.6	157./ 68.1	56./ 86.6	19./ -85.7	21./ 86.9
5	138./ -60.8	47./ -39.7	23./ 60.5	63./ 48.0	14./ 6.2
6	535./ -64.0	300./ -73.8	85./ -70.2	127./ -80.4	25./ -50.3
7	277./ -61.8	180./ -62.6	60./ -46.4	52./ 88.7	6./ 17.7
8	82./ -32.4	62./ -39.0	27./ -35.0	38./ 69.4	4./ 9.1
9	115./ -.9	103./ 15.9	51./ 43.7	131./ -73.4	6./ .1
10	99./ -45.0	91./ 19.1	37./ 33.3	74./ -45.2	8./ -63.7
11	21./ -45.3	89./ 8.2	42./ 19.0	64./ 89.4	15./ 27.1
12	70./ -35.8	18./ 36.1	20./ -12.0	44./ 89.9	14./ 59.2
PEAK-TO-PEAK	8904.	2657.	838.	3654.	596.
	BFAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	REAM .803 (N-M/DEG)
MEAN	-2073.	-193.	-248.	-513.	-499.
HARMONIC-1	427./ -31.8	245./ -69.7	255./ -69.4	250./ -61.3	96./ -74.9
2	146./ -2.5	129./ -14.5	162./ -5.8	184./ -4.0	101./ -14.6
3	145./ -1.6	34./ 18.1	21./ 67.6	50./ -18.6	111./ 2.6
4	99./ -78.5	40./ 74.8	28./ 35.8	35./ -78.8	50./ -39.7
5	109./ 27.1	11./ 50.1	25./ 27.4	32./ 41.1	32./ 65.5
6	41./ -12.7	7./ 17.8	16./ -20.5	3./ -29.4	43./ 27.8
7	32./ 49.7	20./ 51.1	21./ 27.5	16./ 90.1	28./ -30.1
8	44./ 57.3	6./ -83.4	11./ 84.6	11./ 25.7	27./ 79.8
9	73./ 86.7	39./ -85.1	22./ 79.6	41./ -68.0	32./ -42.3
10	30./ -59.8	12./ -58.2	8./ -87.4	20./ -52.0	20./ -43.6
11	16./ -29.4	15./ 55.7	9./ -89.8	8./ 88.5	7./ 82.3
12	45./ 58.3	22./ 60.1	9./ 20.3	12./ 67.7	6./ 40.7
PEAK-TO-PEAK	1392.	713.	771.	883.	694.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 36203. N  
 RUN NO. 6 8139. LB  
 TIME 50121.20 (SEC)

LOADED CG X= 5.04 M = 198.5 TN  
 Y= -.01 M = -.6  
 Z= 1.83 M = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.31 KPA = 27.3 PSF  
 STATIC PRES= 94.2 KPA = 1968. PSF  
 T. AIRSPEED= 93.4 KT TOTAL TEMP= 291.3 DEG K = 524.4 DEG R  
 A/C MACH NO= .141 STATIC TEMP= 290.2 DEG K = 522.3 DEG R  
 BODY ALPHA= -1.9 DEG DENSITY= 1.13 KG/43 = .00220 SLUG/FT3  
 BODY BETA= -2.2 DEG DENSITY ALT= 822. M = 2697. FT  
 SONIC SPEED= 342.1 M/SEC = 1122. FPS  
 RATE OF CLIMB= 21. M/MIN = 70. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	47.97	157.4	-0.039	47.96	157.4	-0.042	ROLL	-1.4	-.001	.029
Y	-1.81	-5.9	.022	-1.81	-5.9	.029	PITCH	-1.5	.005	.014
Z	-1.62	-5.3	-1.022	-1.62	-5.3	-1.022	YAW	155.0	.004	.003

CONTROL ANGLES M.R. COLL= 9.4 DEG HORIZ FIN= 7.6 DEG  
 A1= -.1 DEG T.R. COLL= 1.1 DEG  
 B1= 4.2 DEG PEDAL POS= 1.4 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.9 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -6.1 DEG  
 TIP MAX-MACH= .81 DELTA PSI= 2.2 DEG  
 TIP MIN-MACH= .53  
 .9R MAX-MACH= .74 ENGINE POWER= 401. KW = 538. HP  
 .9R MIN-MACH= .46 THRUST FACTOR= .831E+07 N = .187E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 75 MU= .211 TOTAL CO= .000212 AMB TEMP= 17.0 C = 62.63 F  
 RUN NO. 6 V= 93.4 KT MAST CO= .000195 TFMP U60= 35.0 C = 94.93 F  
 NZ= 1.022 G UMLGA= 33.968 RAD/SEC CAN TEMP= 29.6 C = 85.30 F  
 TIME 50121.14 CLP= .00446 RPM/324= 1.001

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.5 A1= -1.1 B1= 4.4 PEAK-TO-PEAK= 9.0  
 TEETER ANG (DEG) A0= .1 A1= -1.3 B1= .1 PEAK-TO-PEAK= 2.5

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N-DEG) (N-M/DEG) (N-M/DEG) (N-DEG) (N-M/DEG)

MEAN	44656.	134.	-3122.	-2455.	-419.
HARMONIC-1	3961./ -3.0	810./ -9.9	159./ -18.6	1999./ -21.2	278./ -42.3
2	280./ -57.6	129./ -81.8	25./ -82.5	821./ -51.9	85./ -47.7
3	1980./ 65.6	452./ 62.6	60./ 74.5	346./ 12.4	49./ 60.3
4	333./ 52.8	220./ 42.4	82./ 33.9	201./ 87.8	23./ 57.6
5	358./ -44.3	64./ -50.2	7./ 66.1	208./ -37.0	33./ 21.8
6	1094./ 7.0	661./ 3.8	206./ 4.1	175./ 75.3	39./ 68.7
7	200./ 42.7	65./ 82.9	21./ -86.6	34./ 77.7	3./ 63.6
8	128./ 72.3	107./ -74.4	43./ -78.6	37./ -15.1	2./ -75.3
9	24./ 25.0	41./ 3.6	14./ 5.1	44./ 25.5	1./ 88.4
10	44./ 85.9	102./ -39.6	39./ -49.9	56./ -67.0	1./ -15.8
11	79./ -47.4	19./ -78.0	22./ -36.2	10./ 32.8	8./ -43.8
12	52./ 31.3	112./ 47.3	66./ 41.5	17./ -28.9	4./ -.3
PEAK-TO-PEAK	12035.	3270.	846.	5033.	625.

BEAM .174	BEAM .350	BEAM .449	BEAM .606	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN	-2076.	-216.	-246.	-496.	-484.
HARMONIC-1	619./ -39.4	336./ -57.7	353./ -56.8	341./ -59.3	127./ -76.1
2	169./ -57.6	124./ -55.7	136./ -45.3	139./ -35.6	74./ -18.8
3	135./ 45.9	81./ 55.6	64./ 69.3	53./ -63.6	63./ -42.2
4	161./ 53.2	49./ 48.7	29./ 70.4	28./ 54.6	80./ 47.6
5	113./ -48.9	21./ -84.2	3./ -14.9	21./ -89.3	33./ -72.5
6	78./ -4.3	15./ 46.8	14./ 22.4	14./ 88.8	8./ -23.4
7	19./ 51.1	5./ 34.4	9./ -65.4	1./ -30.9	10./ 33.3
8	41./ -40.5	2./ 8.8	10./ -44.0	4./ 52.6	11./ 71.1
9	29./ 13.0	21./ 23.1	7./ 2.7	22./ 31.0	20./ 21.9
10	36./ -71.6	14./ -69.1	13./ -67.8	16./ -58.3	10./ -71.6
11	11./ -5.2	9./ -75.7	5./ -29.1	7./ -75.1	6./ -51.4
12	7./ -57.9	3./ 43.2	3./ 82.0	2./ -40.6	0./ 86.2
PEAK-TO-PEAK	1726.	842.	929.	891.	479.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 36009. N  
 RUN NO. 8 8096. LB  
 TIME 50358.20 (SEC) LOADED CG X= 5.05 M = 198.6 IN  
 Y= -.01 = -.6  
 Z= 1.03 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.89 KPA = 39.6 PSF  
 STATIC PRES= 94.2 KPA = 1968. PSF  
 T. AIRSPEED= 112.2 KT TOTAL TEMP= 291.9 DEG K = 525.5 DFG R  
 A/C MACH NO= .169 STATIC TEMP= 290.3 DEG K = 522.5 DEG R  
 BODY ALPHA= -2.1 DEG DENSITY= 1.13 KG/M3 = .00220 SLUG/FT3  
 BODY BETA= 1.0 DEG DENSITY ALT= 824. M = 2703. FT  
 SONIC SPEED= 342.1 M/SEC = 1122. FPS  
 RATE OF CLIMB= -40. M/MIN = -131. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)	
X	57.68	189.2	-0.053	57.67	189.2	-0.055	ROLL .9	-.005	-.002
Y	1.00	3.3	-.007	.99	3.3	-.008	PITCH -2.7	.006	.009
Z	-2.10	-6.9	-1.025	-2.10	-6.9	-1.025	YAW 291.1	-.005	-.001

CONTROL ANGLES M.R. COLL= 10.1 DEG HORIZ FIN= 8.3 DEG  
 A1= .3 DEG T.R. COLL= 2.5 DEG  
 B1= 5.4 DEG PEDAL POS= 2.8 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.1 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -7.5 DEG  
 TIP MAX-MACH= .84 DELTA PSI= -1.0 DEG  
 TIP MIN-MACH= .50  
 \*R MAX-MACH= .77 ENGINE POWER= 461. KW = 618. HP  
 \*R MIN-MACH= .43 THRUST FACTOR= .835E+07 N = .188E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .253	TOTAL CO= .000242	AMB TFMP= 17.1 C = 62.83 F		
RUN NO.	V= 112.2 KT	MAST CO= .000221	TEMP U60= 35.3 C = 95.62 F		
TIME	NZ= 1.025 G	OMEGA= 34.040 RAD/SEC	CAN TEMP= 28.4 C = 83.20 F		
	CLP= .00443	RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	AO= 8.3 AO= .2	A1= -.5 A1= -1.6	B1= 5.7 B1= -.0	PEAK-TO-PEAK= 11.5 PEAK-TO-PEAK= 3.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	43816.	380.	-3071.	-2887.	-476.
HARMONIC-1	3587. / -33.2	788. / -37.6	156. / -36.3	2407. / -36.6	338. / -50.0
2	494. / 63.4	127. / 67.5	23. / -19.4	1673. / -50.8	169. / -49.1
3	1833. / 41.3	495. / 35.3	78. / 47.6	310. / -23.3	71. / 25.8
4	445. / 34.8	222. / 30.2	89. / 23.5	285. / 72.3	51. / 53.3
5	187. / -83.8	55. / -84.2	30. / -71.2	147. / -9.3	26. / -9.6
6	667. / 18.6	416. / 7.9	124. / 6.0	195. / -39.3	23. / -49.6
7	69. / -23.9	41. / 82.1	21. / -85.2	8. / 69.0	4. / 32.5
8	161. / 83.6	74. / -64.5	32. / -60.1	61. / -20.3	5. / 80.9
9	76. / -3.3	132. / 9.6	43. / 8.7	46. / 73.4	6. / .3
10	100. / 31.1	208. / 7.1	110. / 7.4	77. / 14.3	2. / 31.6
11	68. / 82.2	23. / 31.5	21. / 2.3	18. / -88.9	7. / -25.9
12	124. / 26.3	117. / 18.9	71. / 15.9	17. / -83.7	6. / -33.2
PEAK-TO-PEAK	13319.	3180.	856.	7292.	963.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DFG)	BEAM .803 (N-M/DEG)
MEAN	-2069.	-237.	-267.	-507.	-477.
HARMONIC-1	770. / -56.9	439. / -67.0	435. / -68.4	409. / -72.2	178. / -89.7
2	384. / -58.3	268. / -77.2	283. / -76.0	240. / -71.9	87. / -56.8
3	98. / 62.1	33. / -3.6	43. / 56.6	87. / 76.6	88. / 70.9
4	243. / 52.7	81. / 34.5	47. / 29.6	59. / 53.2	111. / 36.0
5	70. / -6.3	3. / 12.6	26. / 50.0	9. / 23.9	50. / 39.7
6	29. / 81.4	9. / 44.3	23. / 77.8	9. / -60.3	45. / -81.8
7	18. / -53.9	9. / -81.1	21. / 88.7	11. / -34.4	34. / -53.9
8	19. / -7.1	3. / 69.9	10. / -60.2	9. / -20.6	23. / -21.8
9	24. / 54.5	10. / 70.4	3. / 16.1	13. / -59.2	15. / -28.2
10	42. / -4.6	26. / -.2	15. / -5.6	32. / 5.4	26. / 17.2
11	6. / -89.2	8. / -56.6	3. / 27.8	5. / -74.8	3. / 57.1
12	20. / -31.1	8. / -26.9	6. / -84.4	7. / -49.9	3. / -30.2
PEAK-TO-PEAK	2517.	1279.	1299.	1222.	728.

## NASA LANGLEY FLIGHT DATA AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 35824. N  
 RUN NO. 10 8054. LB  
 TIME 50641.70 (SEC) LOADED CG X= 5.05 M = 198.7 TN  
 Y= -.01 \* -.6  
 Z= 1.83 \* 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 2.56 KPA = 53.4 PSF  
 T. AIRSPEED= 130.1 KT STATIC PRES= 94.3 KPA = 1969. PSF  
 A/C MACH NO= .195 TOTAL TEMP= 292.5 DEG K = 526.5 DEG R  
 BODY ALPHA= -3.3 DEG STATIC TEMP= 290.3 DEG K = 522.5 DEG R  
 BODY BETA= -.1 DEG DENSITY= 1.13 KG/M3 = .00220 SLUG/FT3  
 SONIC SPEED= 342.1 M/SEC = 1122. FPS  
 RATE OF CLIMB= -71. M/MIN = -70. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	66.83	219.3	-.073	66.82	219.2	-.071	ROLL	-.3	.007	.028
Y	-.10	-.3	.008	-.08	-.3	.013	PITCH	-3.6	.005	-.007
Z	-3.86	-12.7	-1.016	-3.86	-12.7	-1.016	YAW	75.0	-.000	-.027

CONTROL ANGLES M.R. COLL= 11.7 DEG HORIZ FIN= 9.2 DEG  
 A1= .3 DEG T.R. COLL= 2.8 DEG  
 B1= 6.8 DEG PEDAL POS= 3.2 DEG

ROTOR PARAMETERS SHAFT ALPHA= -3.3 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -10.1 DEG  
 TIP MAX-MACH= .86 DELTA PSI= .1 DEG  
 TIP MIN-MACH= .47  
 .9R MAX-MACH= .80 ENGINE POWER= 563. KW = 755. HP  
 .9R MIN-MACH= .40 THRUST FACTOR= .832E+07 N = .187E+07 LB

## NASA LANGLEY FLIGHT DATA AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 75 MU= .294 TOTAL CO= .000297 AMB TEMP= 17.1 C = 62.81 F  
 RUN NO. 10 V= 130.1 KT MAST CO= .000275 TEMP U60= 36.0 C = 96.87 F  
 TIME 50641.63 NZ= 1.016 G OMEGA= 33.962 RAD/SEC CAN TEMP= 27.7 C = 81.81 F  
 CLP= .00439 RPM/324= 1.001

ROTOR ANGLES THFTA 3/4 (DEG) A0= 9.6 A1= -.7 B1= 7.2 PEAK-TO-PEAK= 14.4  
 TEETER ANG (DEG) A0= .2 A1= -2.0 B1= -.4 PEAK-TO-PEAK= 4.0

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	41352.	790.	-2972.	-3556.	-556.
HARMONIC-1	4293./ -46.6	920./ -54.8	190./ -50.5	3105./ -40.4	409./ -48.0
2	57./ -56.5	54./ -30.7	39./ 24.8	2308./ -49.3	236./ -53.6
3	3131./ 32.9	741./ 33.6	132./ 45.9	388./ -48.9	95./ 11.0
4	717./ 12.8	391./ -1.4	151./ -6.5	450./ 63.5	70./ 20.0
5	260./ 49.1	128./ -75.0	42./ -87.6	249./ -71.3	47./ -2.7
6	564./ -49.0	263./ -46.3	83./ -46.0	127./ -36.9	9./ -32.0
7	45./ -43.3	14./ -30.8	14./ -20.8	37./ 19.7	6./ 57.1
8	112./ -24.1	62./ -38.4	26./ -49.9	78./ -50.0	9./ 85.6
9	47./ -50.4	28./ -11.8	5./ 39.4	31./ 15.5	6./ -67.9
10	57./ -12.2	26./ 32.0	11./ -60.2	74./ -.2	4./ -82.5
11	63./ -50.7	2./ -47.1	8./ -71.8	53./ 79.2	4./ 9.1
12	79./ -22.3	30./ 6.7	9./ 1.3	22./ -29.5	4./ 6.3
PEAK-TO-PEAK	14973.	3840.	756.	9800.	1159.

BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
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MEAN	-1988.	-229.	-244.	-480.	-467.
HARMONIC-1	1106./ -62.7	557./ -65.4	544./ -65.2	493./ -69.5	206./ 87.9
2	496./ -55.3	343./ -85.9	346./ -87.7	300./ -81.1	133./ -57.4
3	254./ 37.9	21./ -58.1	53./ 49.0	148./ 66.4	160./ 65.9
4	365./ 34.4	113./ 10.6	55./ -13.3	83./ 29.0	142./ 13.0
5	110./ -38.1	1./ 20.1	24./ 7.1	10./ -44.2	56./ 22.1
6	23./ -68.8	5./ 28.0	13./ -57.4	10./ -88.4	38./ -78.8
7	21./ 24.6	7./ 48.1	13./ 32.7	5./ -67.4	33./ -88.3
8	22./ -68.0	5./ 41.5	14./ 86.5	11./ -71.9	28./ -61.9
9	19./ 10.2	11./ 84.4	6./ 10.6	15./ -70.3	20./ -43.8
10	40./ -32.7	21./ -31.4	12./ -32.1	27./ -12.8	23./ -2.7
11	9./ -50.2	9./ -64.3	4./ -51.4	8./ -78.5	5./ -69.8
12	14./ -66.0	6./ 88.9	8./ 77.8	7./ -71.8	3./ 88.9
PEAK-TO-PEAK	3647.	1679.	1590.	1501.	972.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 075 AIRCRAFT TOTAL WT = 35635. N  
 RUN NO. 12 8012. LB  
 TIME 50963.20 (SEC) LOADED CG X= 5.05 M = 198.7 IN  
 Y= -.01 = -.6  
 Z= 1.83 = 72.1

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.42 KPA = 71.5 PSF  
 STATIC PRES= 94.5 KPA = 1974. PSF  
 T. AIRSPEED= 150.2 KT TOTAL TEMP= 293.1 DEG K = 527.5 DEG R  
 A/C MACH NO= .226 STATIC TEMP= 290.1 DEG K = 522.1 DEG P  
 BODY ALPHA= -5.9 DEG DENSITY= 1.14 KG/M3 = .00220 SLUG/FT3  
 BODY BETA= -.0 DEG DENSITY ALT= 788. M = 2586. FT  
 SONIC SPEED= 342.0 M/SEC = 1122. FPS  
 RATE OF CLIMB= -22. M/MIN = -71. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC?)		
X	76.84	252.1	-102	76.83	252.1	-104	ROLL	-.7	.001	-.048
Y	-.02	-.1	.015	-.01	-.0	.005	PITCH	-.6.2	.006	.008
Z	-7.95	-26.1	-.996	-7.96	-26.1	-.996	YAW	292.4	.007	-.020

CONTROL ANGLES M.R. COLL= 14.3 DEG HORIZ FIN= 10.5 DEG  
 A1= .0 DEG T.R. COLL= 3.5 DEG  
 B1= 8.3 DEG PEDAL POS= 3.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= -5.9 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -14.2 DEG  
 TIP MAX-MACH= .89 DELTA PSI= .0 DEG  
 TIP MIN-MACH= .44  
 .9R MAX-MACH= .83 ENGINE POWER= 754. KW = 1011. HP  
 .9R MIN-MACH= .37 THRUST FACTOR= .834E+07 N = .188E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .339	TOTAL CQ= .000398	AMB TEMP= 16.9 C = 62.47 F		
RUN NO.	V= 150.2 KT	MAST CQ= .000367	TEMP U60= 36.7 C = 98.14 F		
TIME	NZ= .996 G	OMEGA= 33.961 RAD/SEC	CAN TEMP= 27.3 C = 81.11 F		
	CLP= .00427	RPM/324= 1.001			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 11.9	A1= -.9	B1= 9.2	PEAK-TO-PEAK= 18.4
TEETER ANG (DEG)	A0= .3	A1= -2.3	B1= -.9	PEAK-TO-PEAK= 4.8	
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DFG)	TORSION .449 (N-M/DEG)
MEAN	37191.	1435.	-2881.	-4656.	-678.
HARMONIC-1	7165./ -66.6	1624./ -70.2	300./ -68.0	4064./ -43.4	499./ -46.8
2	926./ -67.8	320./ -35.0	98./ -16.8	3157./ -44.0	310./ -53.7
3	4946./ 46.4	1191./ 46.5	231./ 50.4	468./ -89.9	115./ -2.7
4	848./ -4.7	519./ -5.8	188./ -13.6	593./ 67.0	84./ 12.0
5	449./ 86.7	220./ -73.6	78./ -74.4	260./ -.6	52./ 26.8
6	585./ -83.6	277./ -79.7	88./ -77.9	274./ 2.7	33./ 3.0
7	120./ 78.8	27./ 12.7	13./ 55.5	29./ 86.2	5./ -45.8
8	169./ 57.2	104./ 33.1	31./ 42.3	10./ 23.8	5./ 87.7
9	118./ -24.3	11./ 69.5	8./ -75.7	17./ -13.4	2./ 25.7
10	122./ -21.2	66./ -72.9	54./ -63.8	62./ -70.7	1./ -48.0
11	69./ 11.9	60./ -13.1	32./ -7.8	6./ -45.1	4./ 55.1
12	75./ 88.0	19./ -32.0	16./ -59.3	28./ 44.2	3./ -60.3
PEAK-TO-PEAK	24926.	5814.	1272.	13189.	1435.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1747.	-202.	-213.	-436.	-436.
HARMONIC-1	1732./ -69.6	698./ -68.4	651./ -66.7	599./ -68.8	259./ 89.4
2	730./ -50.1	423./ -87.0	410./ 87.8	330./ -89.8	131./ -57.6
3	517./ 25.4	36./ -22.8	96./ 62.5	238./ 53.5	252./ 49.9
4	421./ 39.5	121./ 9.6	57./ -17.7	81./ 32.4	133./ 5.9
5	129./ -38.8	6./ 22.0	31./ -7.0	13./ -17.0	71./ -3.4
6	35./ -42.7	14./ 9.6	17./ -40.8	16./ 71.0	25./ -63.2
7	9./ -55.2	1./ -13.1	10./ 78.7	14./ -72.0	30./ 83.1
8	21./ 60.2	3./ -74.8	12./ 72.6	9./ 75.4	24./ 89.9
9	12./ -28.9	3./ -27.0	11./ -43.9	7./ -84.6	14./ -60.4
10	30./ -88.1	22./ -81.6	7./ 62.0	24./ -71.7	20./ -54.2
11	20./ -88.6	2./ -65.5	9./ 48.7	5./ -75.0	3./ -57.0
12	12./ -82.7	6./ 69.5	5./ -16.5	4./ -78.9	1./ -11.3
PEAK-TO-PEAK	5409.	2019.	1854.	1822.	1242.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 775 AIRCRAFT TOTAL WT = 35525. N  
 RUN NO. 13 7987. LB  
 TIME 51113.70 (SEC) LOADED CG X= 5.05 M = 198.6 TN  
 Y= -.01 = -.6  
 Z= 1.83 = 72.1

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.95 KPA = 82.5 PSF  
 STATIC PRES= 94.4 KPA = 1971. PSF  
 T. AIRSPD= 161.2 KT TOTAL TEMP= 293.5 DEG K = 528.3 DEG R  
 A/C MACH NO= .243 STATIC TEMP= 290.1 DEG K = 522.1 DEG R  
 BODY ALPHA= -6.7 DEG DENSITY= 1.13 KG/M3 = .00220 SLUG/FT3  
 BODY BETA= -.2 DEG DENSITY ALT= 802. M = 2631. FT  
 SONIC SPEED= 342.0 M/SEC = 1122. FPS  
 RATE OF CLIMB= 59. M/MIN = 193. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	82.38	270.3	-.118	82.37	270.2	-.123	ROLL	-.8	.006	-.061
Y	-.35	-1.2	.023	-.34	-1.1	.010	PITCH	-.6.0	.004	.023
Z	-9.65	-31.7	-1.027	-9.65	-31.7	-1.027	YAW	80.1	-.003	-.028

CONTROL ANGLES M.R. COLL= 15.8 DEG HORIZ FIN= 11.3 DEG  
 AI= -.3 DEG T.R. COLL= 3.9 DEG  
 BI= 9.1 DEG PEDAL POS= 4.3 DFG

ROTOR PARAMETERS SHAFT ALPHA= -6.7 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -15.7 DEG  
 TIP MAX-MACH= .91 DELTA PSI= .2 DEG  
 TIP MIN-MACH= .43  
 .9R MAX-MACH= .85 ENGINE POWER= 878. KW = 1178. HP  
 .9R MIN-MACH= .36 THRUST FACTOR= .838E+07 N = .188E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .363	TOTAL CO= .000459	AMB TEMP= 16.9 C = 62.43 F		
RUN NO.	V= 161.2 KT	MAST CO= .000425	TEMP U60= 37.1 C = 98.87 F		
TIME	NZ= 1.027 G	OMEGA= 34.065 RAD/SEC	CAN TEMP= 27.3 C = 81.11 F		
	CLP= .00436	RPM/324= 1.004			
ROTOR ANGLES	THETA 3/4 (DEG) TESTER ANG (DEG)	AO= 13.3 AO= .3	AI= -1.3 AI= -2.4	BI= 10.4 BI= -1.2	PEAK-TO-PEAK= 20.9 PEAK-TO-PEAK= 5.3
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	35035.	1834.	-2882.	-5272.	-764.
HARMONIC-1	9018./ -68.8	2134./ -72.7	379./ -70.2	4767./ -46.9	573./ -47.7
2	1080./ -50.4	499./ -21.2	160./ -6.3	3796./ -38.9	353./ -52.3
3	6471./ 48.6	1574./ -48.3	306./ 51.2	708./ 70.6	116./ -7.2
4	1183./ -9.2	679./ -14.0	242./ -20.5	669./ 66.2	100./ 9.2
5	599./ 88.7	257./ -68.8	85./ -64.0	272./ 5.4	61./ 42.0
6	636./ -38.6	314./ -42.0	90./ -39.4	305./ 30.7	39./ 32.6
7	188./ -61.6	116./ -59.0	40./ -52.9	61./ 71.7	7./ -19.6
8	156./ 72.3	103./ 46.5	34./ 45.1	5./ -82.5	4./ -75.0
9	11./ -38.5	79./ -17.6	30./ -31.8	24./ -70.7	2./ 28.2
10	132./ -6.9	76./ 83.1	47./ -85.2	48./ -35.0	3./ 65.3
11	62./ 48.0	80./ 19.6	49./ 5.2	8./ 46.0	8./ -35.8
12	82./ 44.2	30./ -3.2	12./ .3	12./ 72.1	5./ -9.5
PEAK-TO-PEAK	31045.	7510.	1612.	15952.	1589.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DFG)	BEAM .803 (N-M/DEG)
MEAN	-1491.	-182.	-202.	-423.	-432.
HARMONIC-1	2209./ -71.6	796./ -69.8	718./ -67.3	661./ -68.8	302./ -89.7
2	886./ -41.3	468./ -83.1	449./ 89.3	361./ 89.9	132./ -62.0
3	733./ 29.1	53./ -9.5	114./ 58.1	301./ 47.8	334./ 44.1
4	441./ 38.5	129./ 7.2	62./ -22.5	77./ 33.5	129./ .9
5	137./ -41.6	7./ -31.1	32./ -18.7	14./ -14.4	72./ -8.4
6	46./ -19.5	17./ 28.8	19./ -28.3	17./ 86.8	18./ -42.0
7	28./ 70.6	5./ -40.1	1./ -45.0	11./ -43.9	18./ 76.7
8	15./ 34.4	3./ -40.7	10./ 64.3	10./ -70.1	25./ -84.3
9	6./ -11.3	7./ 84.4	7./ -73.5	14./ -74.8	20./ -57.4
10	71./ -70.7	14./ -77.3	3./ 77.5	19./ -68.4	15./ -50.8
11	28./ -74.6	6./ -68.7	15./ 72.7	8./ -84.4	6./ -62.5
12	8./ 59.0	4./ 68.8	2./ .?	4./ -56.4	1./ -15.3
PEAK-TO-PEAK	6796.	2363.	2043.	2025.	1476.

## NASA Langley Flight Data AH-1G ---- PAOS PCM DATA

FLIGHT NO. 077 AIRCRAFT TOTAL WT = 36717. N LOADED CG X= 5.03 M = 198.1 IN  
 RUN NO. 2 8255. LB Y= -.00 = -.0  
 TIME 50746.20 (SEC) Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 T. AIRSPEED= 0.0 KT STATIC PRES= 100.4 KPA = 2097. PSF  
 A/C MACH NO= 0.000 TOTAL TEMP= 290.1 DEG K = 522.2 DEG R  
 BODY ALPHA= 2.4 DEG STATIC TEMP= 290.1 DEG K = 522.2 DEG R  
 BODY BETA= -3.4 DEG DENSITY= 1.21 KG/M3 = .00234 SLUG/FT3  
 SONIC SPEED= 342.0 M/SEC = 1122. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	0.00	0.0	-0.023	0.00	0.0	-0.028	ROLL	.0	.001	-.056
Y	0.00	0.0	.007	0.00	0.0	-0.005	PITCH	-.8	-.001	.023
Z	0.00	0.0	-1.027	0.00	0.0	-1.027	YAW	324.2	-.030	.022

CONTROLLING ANGLES M.R. CULL= 10.4 DEG HORIZ FIN= 6.0 DEG  
 A1= -1.7 DEG T.R. CULL= 8.2 DEG  
 B1= -1.4 DEG PEDAL POS= 8.6 DEG

ROTOR PARAMETERS SHAFT ALPHA= 0.0 DEG HUB HEIGHT = 0.8 R  
 HOVER TIP MACH= .67 CONTROL ALPHA= 1.4 DEG  
 TIP MAX-MACH= .67 DELTA PSI= 0.0 DEG  
 TIP MIN-MACH= .67  
 .9R MAX-MACH= .60  
 .9R MIN-MACH= .60 THRUST FACTOR= .884E+07 N = .199E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 77	NU=0.000	TOTAL CO= .000302	AMB TEMP= 17.0 C = 62.52 F		
RUN NO. 2	V= 0.0 KT	MAST CO= .000257	TEMP Ub0= 31.5 C = 88.75 F		
TIME 50746.14	NZ= 1.027 G	OMEGA= 33.943 RAD/SEC	CAN TEMP= 36.2 C = 97.11 F		
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.9	A1= -1.8	B1= -1.1	PEAK-TO-PEAK= 3.9
	TEETER ANG (DEG)	A0= .2	A1= 1.3	B1= -1.6	PEAK-TO-PEAK= 4.2
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	40589.	655.	-2891.	-2691.	-399.
HARMONIC-1	781./ 56.8	335./ 85.1	82./ -67.6	986./ -30.1	25./ -50.4
2	366./ 7.4	107./ 12.6	30./ -2.9	257./ 84.2	22./ 76.6
3	1106./ 31.2	264./ 34.9	57./ 28.3	273./ -87.0	36./ 15.8
4	322./ -12.1	58./ 44.4	31./ 71.9	124./ -35.2	17./ -78.5
5	90./ -63.7	48./ 7.4	14./ -3.5	77./ -33.7	16./ -.0
6	658./ -77.2	357./ -78.5	112./ -80.7	35./ 47.9	11./ 4.1
7	59./ -61.4	89./ 16.4	31./ -13.0	176./ -60.1	9./ 62.1
8	150./ 74.1	66./ -75.1	18./ -60.7	50./ 87.5	1./ -56.9
9	159./ -28.6	31./ -32.4	16./ 14.0	54./ -68.7	6./ -39.0
10	66./ -40.2	40./ 36.9	20./ 39.9	40./ -77.4	2./ 4.1
11	53./ -83.6	18./ -64.5	16./ -56.5	17./ -86.3	2./ -45.8
12	46./ -39.0	14./ -82.1	4./ -22.4	5./ -84.5	1./ -25.4
PEAK-TO-PEAK	4393.	1601.	481.	2531.	164.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1026.	-84.	-127.	-342.	-396.
HARMONIC-1	70./ -17.5	100./ -2.5	112./ 2.9	146./ -8.6	115./ -14.8
2	20./ -71.4	25./ 28.6	42./ 32.5	46./ 49.4	24./ -10.0
3	59./ 63.3	47./ 36.2	45./ 29.3	50./ 15.8	47./ 3.5
4	49./ -76.6	28./ 87.8	11./ -63.4	20./ -88.4	35./ -61.6
5	23./ 67.7	12./ 75.2	10./ -.3	17./ 49.2	18./ -62.2
6	12./ 63.3	5./ -84.2	12./ -67.8	8./ 77.6	19./ 80.3
7	73./ -51.1	28./ -20.3	49./ -39.2	20./ 84.0	51./ -46.0
8	26./ 70.4	4./ 49.5	8./ 53.7	4./ 8.2	6./ -22.1
9	13./ -59.8	6./ -54.2	7./ -14.1	6./ 33.5	4./ -26.8
10	16./ 88.5	6./ 83.8	7./ -83.4	7./ -78.8	8./ -84.6
11	5./ -68.6	10./ -80.1	6./ 57.5	10./ -90.0	5./ -62.0
12	4./ 54.2	5./ 62.8	3./ 11.2	4./ -59.0	2./ 4.1
PEAK-TO-PEAK	476.	373.	375.	503.	375.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 36599. N  
 RUN NO. 2 d228. LB  
 TIME 53534.00 (SEC) LOADED CG X= 5.03 M = 198.2 IN  
 Y= -.00 = -.0  
 Z= 1.82 = 71.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 T. AIRSPEED= 0.0 KT STATIC PRES= 102.0 KPA = 2129. PSF  
 A/C MACH NO= 0.000 TOTAL TEMP= 296.7 DEG K = 534.1 DEG R  
 BODY ALPHA= 17.7 DEG STATIC TEMP= 296.7 DEG K = 534.1 DEG R  
 BODY BETA= 4.9 DEG DENSITY= 1.20 KG/M3 = .00232 SLUG/FT3  
 DENSITY ALT= 239. M = 783. FT  
 SONIC SPEED= 345.9 M/SEC = 1135. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG PATES (RAD/SEC)	ANG ACC (RAD/SEC2)
X	0.00	0.0	-.014	0.00	ROLL	-1.1	.009	.062
Y	0.00	0.0	.009	0.00	PITCH	-.5	.006	-.005
Z	0.00	0.0	-1.005	0.00	YAW	336.8	.052	.017

CONTROL ANGLES M.F. COLL= 11.5 DEG HORIZ FIN= 6.3 DEG  
 A1= -1.7 DEG T.R. COLL= 10.2 DEG  
 B1= -1.4 DEG PEDAL POS= 10.1 DEG

ROTOR PARAMETERS SHAFT ALPHA= 0.0 DEG HUB HEIGHT = 1.9 R  
 HOVER TIP MACH= .64 CONTROL ALPHA= 1.4 DEG  
 TIP MAX-MACH= .64 DELTA PSI= 0.0 DEG  
 TIP MIN-MACH= .64  
 .9R MAX-MACH= .56  
 .9R MIN-MACH= .58 THRUST FACTRK= .834E+07 N = .187E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78 MU=0.000 TOTAL CO= .000364 AMB TEMP= 23.6 C = 74.42 F  
 RUN NO. 2 V= 0.0 KT MAST CO= .000324 TEMP J60= 38.4 C = 101.19 F  
 TIME 53533.88 NZ= 1.005 G GMEGA= 33.525 RAD/SEC CAN TEMP= 41.2 C = 106.14 F  
 CLP= .00439 RPM/324= .988

ROTOR ANGLES THETA 3/4 (DEG) A0= 8.7 A1= -1.8 B1= -1.2 PEAK-TO-PEAK= 4.4  
 TEETEK ANG (DEG) A0= .2 A1= 1.6 B1= -1.6 PEAK-TO-PEAK= 4.4

ROTOR LOADS (AMP/PHASE) DRAG BFACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	38585.	739.	-2626.	-3053.	-421.
HARMONIC-1	1607./ 72.7	522./ 76.4	114./ 60.7	1231./ -32.2	5./ 26.1
2	303./ -45.3	129./ -47.9	25./ -59.8	285./ -12.1	43./ 18.3
3	1049./ 59.4	241./ 68.4	24./ 49.6	135./ -45.7	25./ 30.0
4	754./ 46.7	453./ 23.3	164./ 22.4	254./ 47.5	80./ 26.0
5	322./ -33.0	62./ -63.5	23./ -82.8	104./ 47.2	20./ -73.6
6	308./ 30.6	212./ 43.1	68./ 41.6	158./ 52.7	17./ 48.3
7	207./ 39.9	98./ 5.9	26./ -1.1	22./ -52.3	8./ -31.6
8	286./ 70.0	125./ 44.8	39./ 41.3	22./ 79.4	9./ -80.5
9	111./ 62.9	95./ -36.7	39./ -11.5	11./ 79.7	2./ 69.3
10	73./ 44.6	39./ 60.0	19./ 87.0	49./ -3.8	2./ -65.5
11	57./ 5.6	83./ 62.7	34./ 88.9	10./ 67.6	3./ 25.9
12	86./ 42.1	18./ -31.2	10./ -13.5	12./ 19.0	5./ 77.6
PEAK-TU-PEAK	6178.	2144.	709.	3304.	265.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-994.	-31.	-54.	-248.	-367.
HARMONIC-1	7./ 88.5	8./ 62.2	4./ 88.2	15./ 64.9	33./ 20.5
2	26./ -26.0	44./ -18.9	48./ -12.1	63./ -.9	20./ 28.2
3	63./ 43.1	62./ 48.1	41./ 51.1	20./ 27.8	30./ -63.5
4	228./ 33.4	121./ 20.6	45./ 8.0	78./ 50.5	134./ :0.2
5	58./ 26.3	24./ 24.9	6./ -76.9	24./ 3.6	29./ -23.2
6	21./ 56.9	5./ 50.2	7./ -22.2	6./ 73.2	10./ -51.2
7	21./ -46.6	11./ 50.9	14./ -15.9	10./ -79.4	32./ -17.5
8	23./ -66.3	7./ 17.2	11./ -54.8	7./ 53.8	19./ -61.1
9	8./ 56.1	0./ -51.6	5./ -47.6	1./ 81.4	6./ -48.2
10	12./ -12.0	16./ 3.7	10./ -13.5	18./ -.3	12./ -16.5
11	9./ -32.5	8./ 5.6	6./ 1.5	11./ -2.3	9./ -11.5
12	8./ 76.0	8./ 48.1	4./ 10.8	7./ 9.2	3./ -13.1
PEAK-TU-PEAK	607.	426.	296.	324.	411.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 36127. N  
 RUN NO. 6 8122. LB  
 TIME 54334.70 (SEC) LOADED CG X= 5.04 M = 198.6 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.33 KPA = 27.7 PSF  
 STATIC PRES= 99.4 KPA = 2076. PSF  
 T. AIRSPEED= 92.1 KT TOTAL TEMP= 294.6 DEG K = 530.2 DEG R  
 A/C MACH NO= .138 STATIC TEMP= 293.4 DEG K = 528.2 DEG R  
 BODY ALPHA= -1.1 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 BODY BETA= .4 DEG DENSITY ALT= 389. M = 1275. FT  
 SONIC SPEED= 344.0 M/SEC = 1129. FPS  
 RATE OF CLIMB= -45. M/MIN = -147. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)	
X	47.37	155.4	-0.037	47.35	155.4	-0.034	ROLL .0	.008	.003
Y	.33	1.1	.006	.35	1.1	.007	PITCH -2.0	.007	-.014
Z	-.91	-3.0	-1.019	-.91	-3.0	-1.019	YAW 161.2	-.001	-.022

CONTROL ANGLES M.R. COLL= 9.0 DEG HORIZ FIN= 7.6 DEG  
 A1= .3 DEG T.R. COLL= 1.4 DEG  
 B1= 4.1 DEG PEDAL POS= 1.8 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.1 DEG  
 HOVER TIP MACH= .65 CONTROL ALPHA= -5.2 DEG  
 TIP MAX-MACH= .79 DELTA PSI= -.4 DEG  
 TIP MIN-MACH= .52  
 .9R MAX-MACH= .73 ENGINE POWER= 377. KW = 505. HP  
 .9R MIN-MACH= .45 THRUST FACTOR= .844E+07 N = .190E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .208	TOTAL CO= .000194	AMB TEMP= 20.3 C = 68.54 F		
RUN NO.	V= 92.1 KT	MAST CO= .000185	TEMP U60= 37.8 C = 100.00 F		
TIME	NZ= 1.019 G	OMEGA= 33.938 RAD/SEC	CAN TEMP= 31.9 C = 89.47 F		
	CLP= .00426	RPM/324= 1.000			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 7.1 A0= .2	A1= -.6 A1= -1.3	B1= 4.2 B1= .2	PEAK-TO-PEAK= 8.6 PEAK-TO-PEAK= 2.6
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	44608.	174.	-3022.	-2304.	-426.
HARMONIC-1	3329./ -7.7	697./ -12.9	126./ -20.3	1913./ -28.2	279./ -49.0
2	244./ -81.2	158./ 74.9	124./ -64.6	898./ -48.8	80./ -42.1
3	1930./ 42.6	445./ 35.9	54./ 50.0	324./ 2.6	47./ 47.4
4	386./ 22.7	219./ 18.1	88./ 11.7	230./ 63.6	30./ 27.8
5	392./ -59.0	107./ -70.8	23./ 73.7	188./ -58.8	19./ -11.6
6	1437./ -18.5	847./ -22.9	252./ -20.8	169./ 37.1	35./ 30.3
7	287./ -2.6	145./ .9	47./ 9.5	89./ -1.9	7./ 15.8
8	236./ 63.2	129./ 51.7	54./ 43.7	30./ -71.4	4./ 61.8
9	88./ -83.1	42./ -61.5	18./ -70.7	80./ -40.4	3./ -49.5
10	141./ 7.3	125./ 78.9	52./ 71.3	76./ 46.5	1./ 68.0
11	130./ 28.6	25./ 63.2	24./ 71.9	16./ -54.7	4./ -11.3
12	40./ 85.3	54./ -47.9	32./ -63.8	17./ -36.7	3./ -52.3
PEAK-TO-PEAK	11660.	3407.	956.	5109.	638.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2113.	-244.	-263.	-518.	-498.
HARMONIC-1	570./ -46.6	341./ -63.1	364./ -62.1	351./ -64.1	134./ -78.2
2	189./ -58.9	135./ -61.7	147./ -54.3	144./ -46.1	67./ -38.2
3	151./ 25.1	82./ 32.5	65./ 47.7	53./ -79.9	66./ -61.1
4	192./ 30.9	60./ 27.0	32./ 45.5	36./ 31.2	91./ 25.7
5	121./ -73.4	19./ 76.4	3./ -59.9	20./ 68.2	35./ 85.8
6	78./ -50.3	15./ 4.2	11./ -40.4	18./ 54.8	15./ -74.6
7	34./ 39.4	7./ 16.2	15./ 59.0	1./ 44.9	10./ -22.1
8	47./ -65.8	5./ -37.3	9./ -78.3	5./ 31.7	13./ 45.4
9	43./ -38.6	29./ -31.7	8./ -23.0	29./ -23.4	31./ -19.5
10	47./ 38.6	18./ 39.4	15./ 45.6	19./ 40.9	12./ 43.4
11	5./ 15.3	8./ -4.1	4./ 6.1	9./ 12.4	6./ 24.9
12	7./ -49.8	5./ -1.1	5./ -21.5	4./ -16.2	4./ -15.9
PEAK-TO-PEAK	1710.	920.	958.	943.	531.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 36013. N LOADED CG X= 5.05 M = 198.6 IN  
 RUN NO. 8 8097. LB Y= -.00 = -.0  
 TIME 54497.70 (SEC) Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.87 KPA = 39.1 PSF  
 STATIC PRES= 99.5 KPA = 2078. PSF  
 T. AIRSPEED= 109.2 KT TOTAL TEMP= 295.2 DEG K = 531.3 DFG R  
 A/C MACH NO= .163 STATIC TEMP= 293.6 DEG K = 528.5 DEG R  
 BODY ALPHA= -2.4 DEG DENSITY= 1.18 KG/M3 = .00279 SLUG/FT3  
 BODY BETA= -.0 DEG DENSITY ALT= 383. M = 1257. FT  
 SONIC SPEED= 344.1 M/SEC = 1129. FPS  
 RATE OF CLIMB= -43. M/MIN = -141. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DFG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	56.11	184.1	-0.050	56.11	184.1	-0.047	ROLL	.4	.010	-.051
Y	-.00	-.0	.005	.02	.1	-.005	PITCH	-3.1	-.000	-.016
Z	-2.31	-7.6	-1.014	-2.31	-7.6	-1.014	YAW	159.6	-.000	.019

CONTROL ANGLES M.R. COLL= 10.2 DEG HORIZ FIN= 8.4 DEG  
 A1= .3 DEG T.R. COLL= 2.0 DEG  
 B1= 5.4 DEG PEDAL POS= 2.4 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.4 DEG  
 HOVER TIP MACH=.65 CONTROL ALPHA= -7.8 DEG  
 TIP MAX-MACH=.82 DELTA PSI= -.0 DEG  
 TIP MIN-MACH=.49  
 •R MAX-MACH=.75 ENGINE POWER= 465. KW = 623. HP  
 •R MIN-MACH=.42 THRUST FACTOR= .839E+07 N = .189E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78	MU= .248	TOTAL CO= .000241	AMB TEMP= 20.4 C = 68.80 F		
RUN NO. 8	V= 109.2 KT	MAST CO= .000231	TEMP U60= 38.1 C = 100.62 F		
TIME 54497.60	NZ= 1.014 G	OMEGA= 33.837 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
CLP= .00425		RPM/324= .997			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 8.1 A0= .2	A1= -.6 A1= -1.8	B1= 5.6 B1= -.2	PEAK-TO-PEAK= 11.5 PFPAK-TO-PEAK= 3.7
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	42570.	578.	-2912.	-2824.	-494.
HARMONIC-1	3525. / -26.5	747. / -32.2	147. / -33.3	2396. / -35.1	337. / -48.1
2	451. / -76.5	143. / -75.4	35. / -11.6	1634. / -48.0	156. / -45.4
3	1843. / 45.4	504. / 40.9	82. / 45.7	295. / -28.7	63. / 29.0
4	339. / 46.0	202. / 46.5	80. / 37.6	289. / 74.6	44. / 53.8
5	194. / -62.2	54. / -36.1	29. / -46.0	103. / -3.1	17. / 9.4
6	638. / 30.7	414. / 19.8	128. / 19.7	173. / -23.5	17. / -32.1
7	93. / 84.0	9. / -85.6	13. / -29.0	28. / 49.1	2. / 36.9
8	139. / -74.3	85. / -32.7	43. / -29.4	70. / -22.4	4. / -78.5
9	51. / -31.5	69. / -1.2	32. / -13.7	39. / 73.5	5. / 6.6
10	129. / 28.8	129. / -9.0	62. / -3.4	66. / 38.1	5. / -29.0
11	112. / -13.0	18. / 49.5	9. / 3.6	32. / -76.2	10. / -36.7
12	126. / 30.8	71. / 16.9	51. / 24.3	7. / 40.4	5. / -38.3
PEAK-TO-PEAK	12203.	3048.	716.	7166.	919.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2043.	-245.	-266.	-515.	-493.
HARMONIC-1	780. / -56.2	436. / -65.4	436. / -66.4	418. / -69.5	178. / -86.1
2	380. / -55.3	266. / -74.6	282. / -72.6	237. / -69.0	85. / -56.4
3	86. / 59.6	31. / 13.8	47. / 63.5	81. / 86.1	84. / 79.3
4	246. / 58.8	82. / 45.6	45. / 38.2	63. / 59.0	112. / 42.1
5	61. / 2.7	5. / 47.4	24. / 63.5	6. / 30.8	44. / 51.6
6	20. / -33.9	7. / 60.7	15. / -71.7	10. / -1.6	38. / -55.5
7	33. / 56.4	10. / -89.4	24. / 71.7	3. / -36.4	27. / -66.6
8	12. / -43.0	5. / 37.2	7. / -71.8	5. / -79.3	18. / -19.3
9	19. / 70.8	14. / -84.4	4. / 66.2	15. / -47.6	15. / -27.1
10	44. / 16.1	23. / 8.2	14. / 4.8	28. / 18.7	22. / 25.4
11	3. / -11.1	6. / -23.9	2. / -62.2	3. / -23.4	1. / 76.5
12	14. / -37.8	4. / -44.0	2. / -57.6	5. / -41.4	1. / -34.8
PEAK-TO-PEAK	2561.	1286.	1330.	1222.	745.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 35869. N LOADED CG X= 5.05 M = 198.7 IN  
 RUN NO. 10 8064. LB Y= -.00 \* -.0  
 TIME 54665.10 (SEC) Z= 1.83 \* 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 2.58 KPA = 54.0 PSF  
 STATIC PRES= 99.5 KPA = 2078. PSF  
 T, AIRSPEED= 128.1 KT TOTAL TEMP= 295.5 DEG K = 531.9 DEG R  
 A/C MACH NO= .192 STATIC TEMP= 293.3 DEG K = 528.0 DEG R  
 BODY ALPHA= -3.2 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 BODY BETA= -.8 DEG DENSITY ALT= 373. M = 1225. FT  
 SONIC SPEED= 343.9 M/SEC = 1128. FPS  
 RATE OF CLIMB= -9. M/MIN = -30. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	65.78	215.8	-.070	65.78	215.8	-.071	ROLL	1.1	.007	.025
Y	-.86	-2.8	.021	-.85	-2.8	.027	PITCH	-3.4	.003	.004
Z	-3.72	-12.2	-1.036	-3.72	-12.2	-1.036	YAW	27.7	.014	-.030

CONTROL ANGLES M.R. COLL= 11.7 DEG HORIZ FIN= 9.2 DEG  
 A1= .4 DEG T.R. COLL= 2.4 DEG  
 B1= 6.7 DEG PEDAL POS= 2.8 DEG

ROTOR PARAMETERS SHAFT ALPHA= -3.2 DEG  
 HOVER TIP MACH= .65 CONTROL ALPHA= -9.9 DEG  
 TIP MAX-MACH= .84 DELTA PSI= .7 DEG  
 TIP MIN-MACH= .46  
 .9R MAX-MACH= .78 ENGINE POWER= 559. KW = 750. HP  
 .9R MIN-MACH= .39 THRUST FACTOR= .836E+07 N = 1.88E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78	MU= .291	TOTAL CQ= .000292	AMB TFMP= 20.2 C = 68.36 F		
RUN NO. 10	V= 128.1 KT	MAST CQ= .000282	TEMP U60= 38.5 C = 101.25 F		
	NZ= 1.036 G	OMEGA= 33.767 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
	CLP= .00434	RPM/324= .995			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 9.4	A1= -.7	B1= 7.1	PEAK-TO-PEAK= 14.1
	TEETER ANG (DEG)	A0= .2	A1= -2.1	B1= -.4	PEAK-TO-PEAK= 4.3
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	40393.	944.	-2812.	-3486.	-574.
HARMONIC-1	4255./ -43.9	882./ -51.4	182./ -48.8	3096./ -39.9	410./ -46.7
2	289./ 75.9	64./ -66.5	32./ 26.9	2219./ -43.6	217./ -47.5
3	3163./ 36.7	751./ 36.5	136./ 47.4	387./ -48.7	69./ 19.7
4	661./ 17.5	378./ 5.4	148./ .0	428./ 66.7	67./ 22.2
5	158./ 79.7	139./ -70.4	45./ -75.5	212./ -18.1	37./ 3.9
6	509./ -37.6	264./ -46.5	91./ -49.4	113./ -29.4	10./ -25.8
7	119./ -33.9	31./ -12.2	6./ -25.6	19./ -1.8	4./ -82.7
8	58./ -9.5	58./ -16.6	30./ -31.3	46./ -39.2	8./ -71.9
9	49./ -63.1	30./ 16.7	14./ 54.5	37./ 30.9	6./ -36.1
10	115./ 26.4	39./ -.6	10./ 55.4	61./ -2.1	2./ -62.0
11	74./ -6.6	30./ -44.3	15./ -47.1	36./ 78.5	4./ -14.1
12	33./ 10.2	21./ 40.0	7./ -38.4	23./ -10.1	2./ -22.6
PEAK-TO-PEAK	14976.	3578.	870.	9554.	1112.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1945.	-231.	-244.	-496.	-486.
HARMONIC-1	1114./ -62.6	575./ -64.4	563./ -64.2	511./ -68.6	212./ -89.4
2	495./ -51.0	340./ -81.3	344./ -83.3	303./ -77.0	136./ -55.2
3	250./ 45.5	25./ -43.8	58./ 52.0	155./ 72.0	164./ 70.9
4	375./ 40.6	117./ 15.9	57./ -4.7	85./ 32.9	140./ 18.5
5	102./ -39.4	5./ 12.4	25./ 19.4	8./ -30.4	61./ 26.8
6	7./ -47.0	1./ 73.6	12./ -63.4	9./ -80.5	43./ -76.0
7	19./ 21.8	9./ 44.7	16./ 52.8	8./ -57.5	35./ -80.2
8	23./ -84.9	2./ 33.5	16./ -78.8	11./ -62.4	28./ -55.3
9	15./ 4.7	7./ -86.3	7./ 1.1	11./ -62.8	18./ -32.5
10	41./ -29.4	20./ -28.7	10./ -45.3	24./ -17.6	19./ -7.5
11	3./ -12.3	7./ 88.4	1./ -85.4	3./ -63.0	1./ 87.5
12	18./ -59.4	6./ -62.7	6./ -82.0	6./ -54.4	2./ -32.7
PEAK-TO-PEAK	3671.	1719.	1622.	1543.	976.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 35690. N LOADED CG X= 5.05 M = 198.9 IN  
 RUN NO. 12 8024. LB Y= -.00 = -.0  
 TIME 54905.70 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.44 KPA = 71.8 PSF  
 T, AIRSPEED= 147.5 KT STATIC PRES= 99.6 KPA = 2080. PSF  
 A/C MACH NO= .221 TOTAL TEMP= 296.5 DEG K = 533.7 DEG R  
 BODY ALPHA= -5.5 DEG STATIC TEMP= 293.7 DEG K = 528.6 DEG R  
 BODY BETA= .8 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 BODY ROLL RATE= 344.1 M/SEC = 1129. FPS  
 BODY CLIMB RATE OF CLIMB= -1. M/MIN = -2. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	75.54	247.8	.101	75.53	247.8	-.100	ROLL	.7	.011	-.097
Y	1.02	3.3	-.003	1.04	3.4	-.023	PITCH	-5.5	.005	-.003
Z	-7.22	-23.7	-1.006	-7.22	-23.7	-1.006	YAW	170.4	-.004	-.013

CONTROL ANGLES M.R. COLL= 13.8 DEG HORIZ FIN= 10.3 DEG  
 A1= .4 DEG T.R. COLL= 3.6 DEG  
 B1= 8.0 DEG PEDAL POS= 4.1 DEG

ROTOR PARAMETERS SHAFT ALPHA= -5.5 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -13.4 DEG  
 TIP MAX-MACH= .88 DELTA PSI= -.8 DEG  
 TIP MIN-MACH= .44  
 .9R MAX-MACH= .81 ENGINE POWER= 728. KW = 976. HP  
 .9R MIN-MACH= .37 THRUST FACTOR= .851E+07 N = .191E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .332	TOTAL CO= .000369	AMB TEMP= 20.5 C = 68.90 F		
RUN NO.	V= 147.5 KT	MAST CO= .000360	TEMP U60= 39.2 C = 102.50 F		
TIME	NZ= 1.006 G	OMEGA= 34.088 RAD/SEC	CAN TEMP= 30.4 C = 86.69 F		
	CLP= .00412	RPM/324= 1.005			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 11.3	A1= -.5	B1= 8.7	PEAK-TO-PEAK= 17.2
	TEETER ANG (DEG)	A0= .2	A1= -2.3	B1= -.7	PEAK-TO-PEAK= 4.9
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	37499.	1586.	-2777.	-4466.	-679.
HARMONIC-1	7100./ -65.9	1630./ -69.2	304./ -68.1	4114./ -44.1	502./ -48.8
2	1614./ -65.5	492./ -46.5	125./ -27.4	3070./ -46.7	294./ -55.7
3	4543./ 36.9	1079./ 34.3	207./ 41.1	507./ 85.8	117./ -9.1
4	655./ 7.9	462./ -3.8	170./ -14.6	622./ 58.9	94./ 12.1
5	511./ 84.8	249./ -66.2	85./ -70.0	242./ -6.8	46./ 31.2
6	630./ -70.0	333./ -57.4	100./ -59.7	300./ -1.0	34./ 4.1
7	121./ -1.8	88./ 18.8	26./ 2.7	63./ -61.1	3./ -3.2
8	72./ 10.8	62./ 17.2	20./ 2.2	5./ 79.3	3./ 77.9
9	96./ -19.9	11./ 13.2	18./ -28.7	13./ -13.7	4./ -8.6
10	54./ 17.2	95./ 26.7	47./ 47.9	72./ 88.2	3./ 41.4
11	65./ -79.4	64./ -26.1	36./ -42.7	20./ -40.8	2./ 25.0
12	8./ 86.3	17./ 83.8	7./ -69.3	13./ -17.5	4./ 3.2
PEAK-TO-PEAK	24118.	5955.	1329.	13196.	1428.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1764.	-219.	-223.	-455.	-451.
HARMONIC-1	1739./ -70.6	708./ -69.7	664./ -68.1	608./ -70.6	256./ 88.1
2	778./ -53.2	420./ -89.8	407./ 84.8	325./ 87.7	124./ -61.2
3	479./ 19.1	26./ -26.8	92./ 56.0	232./ 50.5	251./ 47.1
4	469./ 32.5	135./ 4.6	57./ -19.2	89./ 21.1	146./ -.9
5	139./ -43.6	7./ 13.0	32./ -12.5	13./ -7.6	68./ -14.6
6	50./ -21.0	17./ 1.2	29./ -38.6	17./ 74.1	28./ -47.3
7	21./ -75.2	5./ 23.1	12./ 37.2	9./ -89.1	26./ 59.2
8	21./ 19.2	6./ 87.4	17./ 55.2	10./ 73.0	24./ 81.6
9	10./ -46.6	6./ -19.5	11./ -68.9	8./ 61.4	11./ -64.7
10	41./ 80.9	22./ 79.3	7./ 62.4	25./ -89.8	19./ -71.7
11	33./ 85.5	3./ 68.7	9./ 43.0	8./ 69.0	4./ -67.8
12	16./ 54.0	6./ 43.8	8./ 88.9	6./ -88.1	4./ -84.4
PEAK-TO-PEAK	5546.	2098.	1887.	1859.	1260.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 35650. N  
 RUN NO. 13 8015. LB  
 TIME 54970.20 (SEC) LOADED CG X= 5.05 M = 198.8 TN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 4.02 KPA = 84.0 PSF  
 STATIC PRES= 99.6 KPA = 2081. PSF  
 T. AIRSPEED= 159.4 KT TOTAL TEMP= 296.9 DEG K = 534.5 DFG R  
 A/C MACH NO= .238 STATIC TEMP= 293.6 DEG K = 528.5 DEG R  
 BODY ALPHA= -6.8 DEG DENSITY= 1.18 KG/M3 = .00230 SLUG/FT3  
 BODY BETA= .5 DEG DENSITY ALT= 367. M = 1203. FT  
 SONIC SPEED= 344.1 M/SEC = 1129. FPS  
 RATE OF CLIMB= -26. M/MIN = -87. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	81.41	267.1	-115	81.41	267.1	-114	ROLL	2.2	-.000	.027
Y	.67	2.2	.004	.67	2.2	.010	PITCH	-7.1	-.001	-.002
Z	-9.70	-31.8	-1.019	-9.70	-31.8	-1.019	YAW	165.0	.006	.017

CONTROL ANGLES M.R. COLL= 15.7 DEG HORIZ FIN= 11.2 DEG  
 A1= -.1 DEG T.R. COLL= 4.0 DEG  
 B1= 8.9 DEG PEDAL POS= 4.4 DEG

ROTOR PARAMETERS SHAFT ALPHA= -6.8 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -15.6 DEG  
 TIP MAX-MACH= .90 DELTA PSI= -.5 DEG  
 TIP MIN-MACH= .42  
 .9R MAX-MACH= .83 ENGINE POWER= 874. KW = 1172. HP  
 .9R MIN-MACH= .35 THRUST FACTOR= .852E+07 N = .192E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .359	TOTAL CO= .000444	AMB TEMP= 20.4 C = 68.79 F		
RUN NO.	V= 159.4 KT	MAST CO= .000431	TEMP U60= 39.5 C = 103.12 F		
TIME	NZ= 1.019 G	OMEGA= 34.070 RAD/SEC	CAN TEMP= 30.4 C = 86.69 F		
	CLP= .00417	RPM/324= 1.004			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 13.0	A1= -1.0	B1= 10.0	PEAK-TO-PEAK= 20.0
	TEETER ANG (DEG)	A0= .2	A1= -2.6	B1= -1.1	PEAK-TO-PEAK= 5.5
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DFG)	TORSION .449 (N-M/DEG)
MEAN	34951.	1984.	-2707.	-5256.	-776.
HARMONIC-1	7419./ -78.1	1798./ -81.1	315./ -77.8	4594./ -48.1	562./ -48.3
2	498./ -82.0	286./ 31.6	115./ 25.1	3657./ -37.9	331./ -50.1
3	6053./ 48.4	1467./ 48.2	286./ 51.5	600./ 72.7	113./ -3.9
4	1429./ -15.7	719./ -18.3	238./ -23.6	655./ 65.8	93./ 7.5
5	381./ 52.9	195./ -86.9	74./ -80.5	277./ -.3	57./ 30.3
6	344./ -66.9	216./ -74.9	65./ -81.3	239./ 21.5	30./ 24.9
7	465./ 20.0	287./ 8.8	97./ 11.6	112./ 26.1	12./ -49.1
8	305./ 73.8	163./ 78.5	47./ 81.5	25./ 66.4	8./ -85.7
9	75./ 71.8	62./ -32.1	34./ -6.9	23./ 59.4	3./ -83.6
10	195./ -73.8	45./ -19.9	44./ -47.8	49./ -70.6	2./ -13.5
11	115./ 47.9	91./ -12.3	55./ -9.6	16./ 53.4	8./ -70.0
12	51./ 21.1	23./ 74.6	11./ -33.2	19./ 80.5	10./ -65.7
PEAK-TO-PEAK	24952.	5952.	1467.	15207.	1542.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1545.	-197.	-206.	-433.	-445.
HARMONIC-1	2041./ -73.7	781./ -70.7	718./ -68.0	668./ -69.4	303./ -89.5
2	760./ -43.3	459./ -87.7	453./ 86.3	366./ 86.6	133./ -69.4
3	722./ 29.7	48./ 8.8	95./ 47.5	276./ 42.4	313./ 40.2
4	424./ 35.9	122./ 4.2	61./ -30.7	82./ 40.3	119./ 5.6
5	113./ -38.8	12./ -49.3	31./ -25.2	10./ -30.7	74./ -12.9
6	60./ -53.0	18./ 37.0	16./ -32.9	15./ 73.4	18./ -63.1
7	16./ 19.0	9./ -64.3	1./ -46.8	10./ -51.0	18./ 70.0
8	21./ 51.8	4./ 72.6	8./ 42.9	5./ 81.9	19./ 76.8
9	10./ -88.0	14./ 70.2	3./ -32.0	14./ 82.5	20./ -79.4
10	22./ 79.1	18./ 79.9	9./ 64.7	19./ -88.1	17./ -76.6
11	4./ -74.1	6./ -50.2	10./ 43.7	1./ 49.6	2./ -30.6
12	14./ 31.7	4./ 11.5	3./ -77.6	4./ 78.5	1./ -8.2
PEAK-TO-PEAK	6357.	2274.	2047.	2023.	1437.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 35146. N LOADED CG X= 5.05 M = 198.7 IN  
 RUN NO. 20 7901. LB Y= -.00 = -.0  
 TIME 55657.80 (SEC) Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.89 KPA = 39.5 PSF  
 T. AIRSPEED= 110.6 KT STATIC PRES= 97.8 KPA = 2042. PSF  
 A/C MACH NO= .166 TOTAL TEMP= 294.6 DEG K = 530.3 DEG R  
 BODY ALPHA= 8.5 DEG STATIC TEMP= 293.0 DEG K = 527.4 DEG R  
 BODY BETA= -.4 DEG DENSITY= 1.16 KG/M3 = .00226 SLUG/FT3  
 DENSITY ALT= 541. M = 1774. FT  
 SONIC SPEED= 343.7 M/SEC = 1128. FPS  
 RATE OF CLIMB= -688. M/MIN = -2258. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)
X	56.28	184.7	-1.160	55.68	182.7	-.182	.037	.003
Y	-.39	-1.3	.002	-.32	-1.0	.001	.294	.107
Z	8.46	27.8	-2.180	8.47	27.8	-2.161	.033	.020

CONTROL ANGLES M.R. COLL= 9.3 DEG HORIZ FIN= 6.5 DEG  
 A1= .9 DEG T.R. COLL= 1.0 DEG  
 B1= .3 DEG PEDAL POS= 1.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= 8.6 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= 8.3 DEG  
 TIP MAX-MACH= .83 DELTA PSI= .3 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .76 ENGINE POWER= 211. KW = 283. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .854E+07 N = .192E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .244	TOTAL CO= .000104	AMB TEMP= 19.9 C = 67.73 F		
RUN NO.	V= 110.6 KT	MAST CO= .000070	TEMP U60= 37.4 C = 99.37 F		
TIME	NZ= 2.161 G	OMEGA= 34.741 RAD/SEC	CAN TEMP= 29.6 C = 85.30 F		
	CLP= .00859	RPM/324= 1.024			
ROTOR ANGLES	THETA 3/4 (DEG)	AO= 6.5	A1= -.3	B1= .3	PEAK-TO-PEAK= 1.1
	TEETER ANG (DEG)	AO= .1	A1= .8	B1= 1.3	PEAK-TO-PEAK= 2.6
ROTOR LOADS (AMP/PHASE)	DRAG RBRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DEG)	TORSION .449 (N/M/DEG)
MEAN	52397.	-860.	-3256.	-1702.	-366.
HARMONIC-1	7314./ 13.4	1720./ 21.9	291./ 28.1	1223./ 21.8	170./ -41.0
2	1399./ -40.2	720./ -41.5	212./ -50.1	763./ -70.8	105./ -25.9
3	3505./ 30.7	775./ 31.6	117./ 57.2	548./ 87.8	40./ -57.3
4	192./ 30.5	183./ 20.0	111./ 23.4	227./ -67.4	46./ 7.5
5	474./ -47.4	181./ -34.4	30./ -21.1	196./ -30.1	15./ -38.0
6	1680./ 11.3	934./ 4.5	261./ 5.7	310./ 71.5	45./ 83.1
7	421./ -.6	124./ 12.4	56./ 33.8	253./ -88.0	18./ -40.3
8	65./ -25.5	54./ -39.9	25./ 16.7	81./ 7.7	21./ 25.3
9	102./ 10.3	134./ 68.0	38./ 73.2	17./ 35.4	23./ 46.0
10	76./ 21.7	20./ 81.2	5./ 85.0	67./ -77.8	14./ 56.4
11	122./ -40.1	47./ 9.5	39./ 16.6	53./ 1.6	13./ 73.4
12	70./ 54.2	49./ 71.0	11./ -88.3	53./ -68.4	7./ 76.7
PEAK-TO-PEAK	21056.	6884.	1645.	4396.	637.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1211.	-193.	-291.	-659.	-826.
HARMONIC-1	518./ 24.7	396./ -55.8	456./ -61.2	526./ -42.9	390./ -80.8
2	66./ -23.4	141./ -61.1	200./ -51.6	225./ -49.6	176./ -66.9
3	402./ 14.6	158./ 16.0	118./ 33.3	71./ 84.8	91./ -53.4
4	257./ 39.8	80./ 31.0	48./ 41.6	50./ 23.7	143./ 29.2
5	185./ -56.9	39./ -49.5	15./ -38.0	42./ -47.6	73./ -62.4
6	188./ -35.1	16./ -76.8	16./ -33.8	33./ -61.5	14./ 9.6
7	157./ -85.2	34./ -63.5	69./ -69.0	5./ -72.8	70./ -31.4
8	34./ -45.3	9./ -14.0	24./ -33.7	8./ 70.3	33./ 24.4
9	21./ 52.4	21./ 38.9	7./ -80.3	26./ 50.9	32./ 46.2
10	76./ 86.3	29./ -87.8	24./ 89.4	33./ 89.4	24./ 60.8
11	22./ -38.1	10./ 14.4	15./ -44.4	9./ -19.1	2./ 72.1
12	39./ 50.9	15./ 70.6	17./ 7.8	13./ 39.4	4./ -86.5
PEAK-TO-PEAK	1960.	1126.	1302.	1261.	1206.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 34920. N LOADED CG X= 5.05 M = 198.7 IN  
 RUN NO. 24 7851. LB Y= -.00 M = -.0  
 TIME 56018.20 (SEC) Z= 1.83 M = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.82 KPA = 38.0 PSF  
 STATIC PRES= 96.6 KPA = 2017. PSF  
 T. AIRSPEED= 109.0 KT TOTAL TEMP= 293.9 DEG K = 529.0 DEG R  
 A/C MACH NO= .163 STATIC TEMP= 292.3 DEG K = 526.2 DEG R  
 BODY ALPHA= -1.7 DEG DENSITY= 1.15 KG/M3 = .00223 SLUG/FT3  
 BODY BETA= 2.1 DEG DENSITY ALT= 644. M = 2114. FT  
 SONIC SPEED= 343.3 M/SEC = 1126. FPS  
 RATE OF CLIMB= -25. M/MIN = -80. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SFC)	ANG ACC (RAD/SEC2)		
X	56.01	183.8	-0.050	56.01	183.7	-0.049	ROLL	-1.1	-.001	-.010
Y	2.02	6.6	-.013	2.02	6.6	-.016	PITCH	-2.2	.003	-.005
Z	-1.69	-5.5	-1.057	-1.68	-5.5	-1.057	YAW	87.2	-.002	.002

CONTROL ANGLFS M.R. COLL= 9.8 DEG HORIZ FIN= 8.2 DEG  
 A1= .5 DEG T.R. COLL= 2.5 DEG  
 B1= 5.1 DEG PEDAL POS= 2.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.7 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -6.9 DEG  
 TIP MAX-MACH= .82 DELTA PSI= -2.1 DEG  
 TIP MIN-MACH= .49  
 .9R MAX-MACH= .76 ENGINE POWER= 432. KW = 579. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .828E+07 N = .186E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .246	TOTAL CQ= .000226	AMB TFMP= 19.2 C = 66.48 F		
RUN NO.	V= 109.0 KT	HAST CQ= .000216	TEMP U60= 37.3 C = 99.17 F		
	NZ= 1.057 G	OMEGA= 34.039 RAD/SEC	CAN TEMP= 29.2 C = 84.60 F		
TIME	CLP= .00436	RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.9	A1= -.2	B1= 5.4	PEAK-TO-PEAK= 11.2
	TEETER ANG (DEG)	A0= .2	A1= -1.6	B1= .0	PEAK-TO-PEAK= 3.2
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	43384.	425.	-3064.	-2717.	-471.
HARMONIC-1	3164./ -28.7	679./ -34.3	137./ -37.5	2287./ -38.2	328./ -53.1
2	276./ 78.7	50./ 68.8	29./ -10.0	1616./ -56.3	157./ -52.9
3	1747./ 38.7	446./ 35.8	63./ 44.5	256./ -36.2	58./ 15.6
4	487./ 37.1	277./ 30.3	103./ 24.1	325./ 63.6	53./ 39.6
5	109./ 22.2	41./ 62.8	20./ 77.0	117./ -30.2	13./ -28.9
6	903./ 14.4	467./ 4.6	142./ 2.8	158./ -52.5	18./ -72.7
7	210./ 29.8	155./ 48.9	60./ 47.1	80./ 8.1	9./ 34.0
8	102./ -85.3	71./ 86.3	40./ 88.2	61./ -64.4	5./ 79.8
9	84./ -10.4	119./ -32.9	49./ -41.7	55./ 59.7	6./ -56.9
10	128./ 18.1	195./ -11.1	100./ -5.6	84./ 18.7	5./ 76.6
11	110./ -29.5	13./ -2.9	7./ -56.5	31./ 80.9	5./ -44.4
12	89./ .2	106./ -4.4	73./ 2.1	7./ -11.3	5./ -84.8
PEAK-TO-PEAK	11632.	2647.	828.	7031.	887.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2136.	-267.	-282.	-523.	-492.
HARMONIC-1	720./ -58.2	422./ -69.2	424./ -70.2	406./ -73.4	175./ 89.8
2	356./ -64.4	257./ -82.2	270./ -80.5	221./ -77.2	71./ -65.7
3	62./ 53.5	33./ 5.1	43./ 53.2	72./ 72.0	74./ 64.4
4	286./ 49.6	91./ 32.6	51./ 22.5	70./ 47.9	115./ 34.2
5	69./ -7.5	1./ 86.0	22./ 41.5	8./ 23.9	36./ 24.1
6	9./ -27.0	4./ -5.3	11./ 88.0	12./ -28.7	33./ -73.3
7	48./ 10.6	11./ 32.9	27./ 32.9	9./ -64.9	33./ 77.5
8	18./ 79.0	5./ -68.0	8./ 53.8	11./ -62.5	21./ -57.9
9	11./ 75.3	18./ 71.7	1./ 38.9	23./ -87.4	19./ -69.0
10	51./ -21.7	30./ -15.3	18./ -33.1	32./ -14.4	25./ -1.2
11	2./ 13.3	6./ 71.8	3./ -46.3	2./ 41.0	2./ 41.8
12	26./ 60.9	6./ 61.7	11./ 32.8	5./ 56.1	4./ 60.5
PEAK-TO-PEAK	2474.	1256.	1274.	1226.	736.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 34871. N  
 RUN NO. 27 7840. LB  
 TIME 56099.80 (SEC) LOADED CG X= 5.05 M = 198.7 IN  
 Y= -.00 = -.0  
 Z= 1.84 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.79 KPA = 37.5 PSF  
 STATIC PRES= 98.5 KPA = 2058. PSF  
 T. AIRSPEED= 107.4 KT TOTAL TEMP= 294.9 DEG K = 530.9 DEG R  
 A/C MACH NO= .161 STATIC TEMP= 293.4 DEG K = 528.1 DEG R  
 BODY ALPHA= 2.3 DEG DENSITY= 1.17 KG/M3 = .00227 SLUG/FT3  
 BODY BETA= 1.5 DEG DENSITY ALT= 476. M = 1560. FT  
 SONIC SPEED= 344.0 M/SEC = 1128. FPS  
 RATE OF CLIMB= -678. M/MIN = -2225. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.19	181.1	-0.087	54.85	180.0	-0.087	ROLL	54.4	.020	.020
Y	1.49	4.9	-0.010	1.52	5.0	-0.010	PITCH	-9.2	.164	.002
Z	2.17	7.1	-1.578	2.18	7.1	-1.573	YAW	116.9	.131	-.007

CONTROL ANGLES M.R. COLL= 9.8 DEG HORIZ FIN= 7.2 DEG  
 A1= .7 DEG T.R. COLL= .4 DEG  
 B1= 2.8 DEG PEDAL POS= .1 DEG

ROTOR PARAMETERS SHAFT ALPHA= 2.3 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -.5 DEG  
 TIP MAX-MACH= .83 DELTA PSI= -1.6 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .76 ENGINE POWER= 296. KW = 397. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .862E+07 N = .194E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78 MU= .239 TOTAL CO= .000147 AMR TEMP= 20.3 C = 68.45 F  
 RUN NO. 27 V= 107.4 KT MAST CO= .000133 TEMP U60= 37.4 C = 99.37 F  
 TIME 56099.65 NZ= 1.573 G OMEGA= 34.496 RAD/SEC CAN TEMP= 29.2 C = 84.60 F  
 CLP= .00622 RPM/324= 1.017

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.4 A1= -.2 B1= 3.1 PEAK-TO-PEAK= 6.7  
 TEETER ANG (DEG) A0= .2 A1= -.6 B1= .7 PFAK-TO-PEAK= 1.9

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 PITCH LINK TORSION .449  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	47721.	-126.	-3098.	-2266.	-466.
HARMONIC-1	5509./ 7.3	1112./ 10.6	199./ 6.2	1805./ -35.4	302./ -59.1
2	342./ 5.0	266./ -22.1	80./ -88.4	1008./ -24.2	108./ -1.8
3	2608./ 41.7	598./ 44.1	92./ 59.6	384./ 48.0	52./ 60.3
4	341./ 78.0	251./ 53.7	136./ 44.9	424./ -71.0	72./ 64.1
5	570./ -25.9	148./ -43.8	15./ -47.1	34./ -15.9	29./ -45.7
6	1701./ -3.9	1031./ -10.3	303./ -9.2	328./ 61.4	70./ 56.7
7	358./ -10.1	123./ 15.9	42./ 20.4	130./ 58.4	28./ 68.7
8	49./ 60.4	49./ -68.0	25./ -48.9	25./ -25.1	13./ 83.4
9	80./ -13.7	137./ 88.0	47./ 75.6	109./ -47.2	9./ -1.1
10	56./ 36.4	119./ -13.5	67./ -30.8	132./ 28.9	16./ -1.5
11	132./ 1.1	16./ -5.9	13./ -22.8	22./ -53.8	6./ 88.6
12	161./ -44.5	48./ -4.4	13./ -29.1	16./ -84.3	8./ -43.3
PEAK-TO-PEAK	15509.	4897.	1264.	5525.	770.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-1708.	-250.	-312.	-625.	-669.
HARMONIC-1	501./ -20.8	416./ -61.4	444./ -64.7	456./ -68.9	284./ -85.3
2	238./ -37.4	229./ -64.7	273./ -63.0	272./ -64.1	140./ -83.6
3	171./ 3.7	95./ 13.4	75./ 40.1	79./ 82.8	94./ -87.5
4	424./ 74.2	135./ 58.6	68./ 58.5	97./ 68.6	174./ 58.1
5	94./ -27.3	23./ -37.1	26./ 87.1	26./ -15.4	63./ -71.2
6	100./ -44.9	20./ 63.7	12./ 60.8	13./ 62.0	44./ -63.4
7	56./ 76.3	24./ 79.2	40./ -87.4	10./ -14.7	57./ -53.5
8	6./ -33.9	4./ -20.1	11./ -34.0	13./ -32.6	24./ -29.4
9	46./ -57.3	32./ -51.8	14./ -82.9	38./ -43.7	35./ -39.4
10	59./ 32.0	28./ 42.4	13./ 19.7	29./ 39.5	21./ 26.7
11	15./ 36.4	2./ -77.3	7./ 31.8	4./ -30.6	12./ -32.8
12	18./ -28.6	8./ -55.7	8./ -61.8	5./ 16.0	6./ -63.6
PEAK-TO-PEAK	2385.	1309.	1354.	1421.	1081.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 34675. N  
 RUN NO. 30 7796. LB  
 TIME 56410.10 (SEC)

AERODYNAMIC FLIGHT STATE

T. AIRSPEED= 110.1 KT	DYNAMIC PRES= 1.87 KPA	= 39.1 PSF
A/C MACH NO= .165	STATIC PRES= 97.7 KPA	= 2041. PSF
	TOTAL TEMP= 294.7 DEG K	= 530.5 DFG R
	STATIC TEMP= 293.1 DEG K	= 527.6 DEG R
BODY ALPHA= 6.1 DEG	DENSITY= 1.16 KG/M3	= .00226 SLUG/FT3
BODY BETA= 2.1 DEG	DENSITY ALT= 549. M	= 1800. FT
	SONIC SPEED= 343.8 M/SEC	= 1128. FPS
	RATE OF CLIMB= -898. M/MIN	= -2947. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)	
X	56.30	184.7	-1.126	55.75	182.9	-1.132	ROLL 58.5	.100	.178
Y	2.06	6.7	-0.017	2.25	7.4	.011	PITCH -10.4	.269	.011
Z	6.02	19.7	-2.060	6.02	19.8	-2.042	YAW 193.3	.160	.039

CONTROL ANGLES

M.R. COLL=	9.8 DEG	HORIZ FIN=	6.8 DEG
A1=	1.4 DEG	T.R. COLL=	-.4 DEG
B1=	1.7 DEG	PEDAL POS=	-.5 DEG

ROTOR PARAMETERS

HOVER TIP MACH= .68	SHAFT ALPHA= 6.2 DEG
	CONTROL ALPHA= 4.5 DEG
TIP MAX-MACH= .84	DELTA PSI= -2.3 DEG
TIP MIN-MACH= .51	
.9R MAX-MACH= .78	ENGINE POWER= 171. KW = 229. HP
.9R MIN-MACH= .45	THRUST FACTOR= .893E+07 N = .201E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78 MU= .240 TOTAL CQ= .000080 AMB TEMP= 19.9 C = 67.90 F  
 RUN NO. 30 V= 110.1 KT MAST CQ= .000060 TEMP U60= 37.1 C = 98.75 F  
 TIME 56410.00 NZ= 2.042 G OMEGA= 35.171 RAD/SEC CAN TEMP= 29.2 C = 84.60 F  
 CLP= .00782 RPM/324= 1.037

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.1 A1= .1 B1= 1.7 PEAK-TO-PEAK= 3.7  
 TEETER ANG (DEG) A0= .0 A1= .1 B1= 1.0 PEAK-TO-PEAK= 1.7

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	53097.	-887.	-3327.	-2128.	-419.
HARMONIC-1	7248./ 2.1	1648./ 12.2	257./ 12.0	1688./ -12.1	239./ -53.5
2	713./ -82.6	533./ -57.2	169./ -66.5	740./ -2.1	84./ -7.4
3	4205./ 26.8	954./ 26.2	140./ 42.1	476./ 54.6	36./ 49.6
4	168./ -57.2	123./ 53.0	111./ 37.9	311./ -76.7	43./ 23.4
5	450./ -58.3	123./ -35.2	23./ 1.2	190./ -35.3	7./ .6
6	1602./ -14.2	927./ -23.2	273./ -23.8	366./ 56.7	72./ 66.9
7	283./ -51.4	29./ 4.9	29./ 37.7	184./ 63.3	27./ -76.7
8	129./ 68.0	121./ 56.4	32./ 52.1	67./ -14.5	22./ -51.5
9	116./ 26.2	209./ 40.6	98./ 43.0	95./ 14.8	19./ -31.5
10	79./ -24.1	23./ 10.4	26./ -1.8	42./ -76.8	13./ -26.0
11	52./ 63.1	57./ -22.3	50./ -6.5	67./ -23.0	1./ -20.2
12	82./ -84.1	12./ 50.1	21./ 39.4	45./ 83.1	2./ 54.8
PEAK-TO-PEAK	21048.	6750.	1550.	4771.	842.

REAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	REAM .803 (N-M/DEG)
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MEAN	-1413.	-214.	-290.	-642.	-782.
HARMONIC-1	509./ 1.1	397./ -59.7	443./ -64.3	502./ -65.6	350./ -80.9
2	36./ 53.6	164./ -68.4	231./ -59.2	264./ -59.4	193./ -72.9
3	386./ 9.1	165./ 10.4	123./ 30.9	84./ 72.1	87./ -73.1
4	325./ 56.2	102./ 46.2	63./ 47.7	63./ 51.4	166./ 43.8
5	112./ -68.0	28./ -63.9	21./ -74.4	26./ -34.3	71./ -86.4
6	162./ -53.2	16./ 52.9	11./ -42.4	21./ -79.8	18./ -41.6
7	121./ 72.7	30./ 79.5	55./ 87.6	4./ -55.2	54./ -49.7
8	22./ 64.5	4./ 57.8	15./ -67.0	4./ -38.3	18./ .3
9	53./ -6.2	44./ 4.6	8./ -11.6	46./ 16.7	45./ 27.8
10	52./ 43.5	19./ 54.5	14./ 41.8	22./ 51.1	19./ 53.0
11	23./ -63.1	7./ -40.0	14./ -59.9	8./ -32.0	1./ 78.3
12	28./ 7.7	11./ 24.5	19./ -28.6	12./ 7.4	3./ 46.8
PEAK-TO-PEAK	2258.	1152.	1275.	1381.	1276.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 078 AIRCRAFT TOTAL WT = 34445. N LOADED CG X= 5.04 M = 198.6 IN  
 RUN NO. 37 7744. LB Y= -.00 M = -.0  
 TIME 56756.70 (SEC) Z= 1.84 M = 72.4

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.84 KPA = 38.4 PSF  
 STATIC PRES= 96.4 KPA = 2012. PSF  
 T. AIRSPEED= 109.7 KT TOTAL TEMP= 294.0 DEG K = 529.2 DEG R  
 A/C MACH NO= .164 STATIC TEMP= 292.4 DEG K = 526.4 DEG R  
 BODY ALPHA= .1 DEG DENSITY= 1.15 KG/M3 = .00223 SLUG/FT3  
 BODY BETA= .6 DFG DENSITY ALT= 671. M = 2203. FT  
 SONIC SPEED= 343.4 M/SEC = 1127. FPS  
 RATE OF CLIMB= -62. M/MIN = -203. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATEFS (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	56.44	185.2	-0.057	56.29	184.7	-0.054	ROLL	-32.7	-.012	.056
Y	.61	2.0	-0.003	.59	1.9	.010	PITCH	-1.3	.072	-.012
Z	.13	.4	-1.260	.13	.4	-1.259	YAW	294.6	-.087	.016

CONTROL ANGLES M.R. COLL= 10.0 DEG HORIZ FIN= 7.9 DEG  
 A1= .4 DEG T.R. COLL= 2.7 DEG  
 B1= 4.6 DEG PEDAL POS= 3.6 DFG

ROTOR PARAMETERS SHAFT ALPHA= .1 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -4.5 DEG  
 TIP MAX-MACH= .82 DELTA PSI= -.6 DEG  
 TIP MIN-MACH= .50  
 •9R MAX-MACH= .76 ENGINE POWER= 421. KW = 564. HP  
 •9R MIN-MACH= .43 THRUST FACTOR= .832E+07 N = .187E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .246	TOTAL CQ= .000218	AMB TEMP= 19.3 C = 66.69 F		
RUN NO.	V= 109.7 KT	MAST CQ= .000206	TEMP U60= 37.1 C = 98.87 F		
TIME	NZ= 1.259 G	OMEGA= 34.159 RAD/SEC	CAN TEMP= 29.2 C = 84.60 F		
	CLP= .00510	RPM/324= 1.007			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.8	A1= -.5	B1= 4.8	PEAK-TO-PEAK= 10.0
	TEETER ANG (DEG)	A0= .2	A1= -1.3	B1= .1	PEAK-TO-PEAK= 2.4
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LTNK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	44657.	434.	-3095.	-2663.	-491.
HARMONIC-1	3874. / -9.4	810. / -13.8	154. / -14.2	2122. / -32.4	314. / -50.2
2	288. / 62.1	58. / -5.2	39. / 19.6	1520. / -43.4	146. / -37.7
3	1982. / 46.0	500. / 45.6	79. / 58.6	260. / -7.0	58. / 43.1
4	436. / 53.6	276. / 45.8	118. / 39.5	386. / 86.0	66. / 50.3
5	157. / -26.8	20. / 27.8	28. / -80.6	160. / -13.4	18. / 27.1
6	1296. / -5.8	759. / -13.8	219. / -14.8	130. / 65.2	29. / 50.5
7	299. / 54.9	145. / 83.7	49. / 88.4	93. / 33.0	13. / 42.5
8	208. / 79.8	110. / 52.3	33. / 47.2	29. / 11.3	5. / 81.7
9	82. / -4.5	82. / 76.0	35. / 61.5	100. / -85.0	2. / 54.2
10	56. / -6.6	68. / 28.2	15. / -12.6	99. / 19.6	8. / 17.0
11	51. / -74.4	34. / 53.2	21. / 17.2	16. / -24.9	5. / 45.2
12	230. / -16.1	90. / -22.3	52. / -15.6	24. / -78.1	8. / -38.7
PEAK-TO-PEAK	12186.	3838.	940.	6529.	852.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1952.	-259.	-297.	-559.	-550.
HARMONIC-1	647. / -43.6	423. / -63.8	430. / -66.8	430. / -70.3	220. / -89.1
2	336. / -53.4	257. / -73.2	286. / -72.3	239. / -70.6	78. / -73.3
3	57. / -73.8	49. / 4.1	51. / 49.9	70. / 82.0	77. / 79.5
4	330. / 62.6	107. / 47.5	61. / 39.7	82. / 57.9	140. / 44.5
5	106. / -21.1	13. / -47.9	27. / 56.1	16. / -20.1	48. / 72.6
6	66. / -35.1	10. / 20.1	14. / 36.0	9. / -3.5	37. / -75.5
7	26. / 31.1	10. / 78.8	19. / 80.4	11. / -31.9	44. / -52.5
8	23. / 70.7	5. / 90.0	8. / 37.8	10. / -23.3	21. / -6.0
9	47. / 88.9	30. / 88.7	15. / 82.6	30. / -77.2	25. / -55.8
10	53. / -8.9	25. / 2.8	15. / -23.7	32. / 12.7	26. / 17.0
11	4. / -13.8	3. / -31.6	2. / 11.9	3. / -78.6	3. / 8.3
12	20. / -21.2	8. / -15.0	10. / -75.3	7. / -37.2	2. / -13.5
PEAK-TO-PEAK	2297.	1261.	1305.	1320.	832.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 278 AIRCRAFT TOTAL WT = 34419. N  
 RUN NO. 39 7738. LB  
 TIME 56776.70 (SEC) LOADED CG X= 5.04 M = 198.6 IN  
 Y= -.00 = -.0  
 Z= 1.84 = 72.4

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.75 KPA = 36.5 PSF  
 STATIC PRES= 96.8 KPA = 2022. PSF  
 T. AIRSPEED= 106.8 KT TOTAL TEMP= 294.1 DEG K = 529.4 DEG R  
 A/C MACH NO= .160 STATIC TEMP= 292.6 DEG K = 526.7 DEG P  
 BODY ALPHA= 1.3 DEG DENSITY= 1.15 KG/M3 = .00224 SLUG/FT3  
 BODY BETA= .7 DEG DENSITY ALT= 628. M = 2059. FT  
 SONIC SPEED= 343.5 M/SEC = 1127. FPS  
 RATE OF CLIMB= -484. M/MIN = -1588. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SFC)	ANG ACC (RAD/SEC2)		
X	54.92	180.2	-0.067	54.64	179.3	-0.068	ROLL	-47.9	-.039	-.006
Y	.65	2.1	-.008	.58	1.9	-.005	PITCH	-8.1	.135	-.002
Z	1.29	4.2	-1.418	1.29	4.2	-1.414	YAW	128.9	-.135	.009

CONTROL ANGLES M.R. COLL= 10.1 DEG HORIZ FIN= 7.5 DEG  
 A1= .2 DEG T.R. COLL= 2.8 DEG  
 B1= 3.7 DEG PEDAL POS= 3.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= 1.4 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -2.4 DEG  
 TIP MAX-MACH= .82 DELTA PSI= -.6 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .76 ENGINE POWER= 386. KW = 517. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .841E+07 N = .189E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 78 MU= .239 TOTAL CO= .000198 AMB TEMP= 19.5 C = 67.02 F  
 V= 106.8 KT MAST CO= .000184 TEMP U60= 37.4 C = 99.34 F  
 RUN NO. 39 NZ= 1.414 G OMEGA= 34.258 RAD/SEC CAN TEMP= 29.2 C = 84.60 F  
 TIME 56776.55 CLP= .00568 RPM/324= 1.010

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.8 A1= -.7 B1= 4.0 PEAK-TO-PEAK= 8.2  
 TEETER ANG (DEG) A0= .2 A1= -1.0 B1= .4 PFAK-TO-PEAK= 2.0

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	45974.	265.	-3078.	-2439.	-481.
HARMONIC-1	5179./ 5.5	1062./ 3.1	214./ 4.5	1823./ -24.9	284./ -53.0
2	176./ -72.9	154./ -47.0	54./ 56.6	1353./ -32.0	140./ -24.3
3	2347./ 53.8	556./ 53.0	81./ 70.5	350./ 23.5	57./ 58.6
4	448./ 58.6	311./ 42.4	150./ 37.6	441./ -83.9	74./ 55.2
5	590./ -53.8	138./ -50.6	21./ -11.0	147./ -30.0	26./ 71.1
6	1614./ -21.2	954./ -26.7	269./ -26.4	321./ 30.7	63./ 30.5
7	148./ -18.1	24./ -58.4	15./ 88.3	70./ 55.1	17./ 48.7
8	140./ -74.5	92./ -82.5	35./ -67.0	50./ 43.8	5./ -82.7
9	112./ -73.7	70./ 48.1	29./ 51.2	70./ -76.6	2./ -1.8
10	33./ -74.6	203./ 6.8	107./ 1.2	89./ 81.6	4./ 87.2
11	109./ -.4	63./ 38.7	40./ 82.4	43./ -25.2	1./ -11.8
12	35./ -41.2	29./ 1.2	16./ 76.9	22./ -22.5	16./ -67.3
PEAK-TO-PEAK	14402.	4897.	1378.	5853.	785.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-1808.	-254.	-305.	-587.	-611.
HARMONIC-1	609./ -21.8	400./ -60.3	421./ -64.0	435./ -69.6	259./ 88.3
2	272./ -41.4	232./ -68.9	261./ -68.6	221./ -68.8	71./ -83.2
3	73./ 1.5	67./ 25.0	64./ 54.2	71./ 89.0	83./ -84.0
4	383./ 66.9	123./ 50.8	62./ 43.0	87./ 61.1	152./ 45.4
5	162./ -43.9	24./ -56.6	17./ 67.0	32./ -43.7	58./ -75.3
6	144./ -48.3	21./ 16.2	19./ -20.7	14./ 60.2	26./ -78.6
7	14./ 15.5	8./ 75.6	19./ -78.7	12./ -22.1	47./ -43.2
8	53./ 53.4	9./ 82.3	19./ 34.5	12./ -10.5	25./ 17.3
9	43./ 89.7	26./ -77.6	14./ 81.1	26./ -53.9	22./ -29.2
10	51./ 50.3	28./ 69.2	17./ 46.1	28./ 61.1	23./ 51.4
11	2./ 78.0	10./ -28.4	7./ 4.4	5./ 41.2	9./ -52.0
12	44./ -62.3	15./ -60.4	14./ -79.3	10./ -59.7	3./ -43.7
PEAK-TO-PEAK	2545.	1256.	1275.	1277.	915.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 079 AIRCRAFT TOTAL WT = 33597. N  
 RUN NO. 9 7553. LB  
 TIME 64430.60 (SEC) LOADED CG X= 5.03 M = 198.1 IN  
 Y= -.00 = -.0  
 Z= 1.85 = 73.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.73 KPA = 36.1 PSF  
 STATIC PRES= 97.0 KPA = 2027. PSF  
 T. AIRSPEED= 106.0 KT TOTAL TEMP= 293.5 DEG K = 528.4 DEG R  
 A/C MACH NO= .159 STATIC TEMP= 292.1 DEG K = 525.7 DEG R  
 BODY ALPHA= -2.4 DEG DENSITY= 1.16 KG/M3 = .00225 SLUG/FT3  
 BODY BETA= .8 DEG DENSITY ALT= 585. M = 1919. FT  
 SONIC SPEED= 343.2 M/SEC = 1126. FPS  
 RATE OF CLIMB= -2. M/MIN = -7. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.48	178.7	-0.058	54.47	178.7	-.060	ROLL	.2	.005	.027
Y	.74	2.4	.001	.75	2.5	.007	PITCH	-2.4	.002	.008
Z	-2.24	-7.4	-1.025	-2.24	-7.4	-1.025	YAW	340.9	-.004	.015

CONTROL ANGLES M.R. COLL= 9.4 DEG HORIZ FIN= 7.8 DEG  
 A1= .4 DEG T.R. COLL= 1.9 DEG  
 B1= 4.6 DEG PEDAL POS= 2.3 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.4 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -6.9 DEG  
 TIP MAX-MACH= .82 DELTA PSI= -.8 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .75 ENGINE POWER= 415. KW = 557. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .834E+07 N = .188E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .239	TOTAL CO= .000215	AMB TEMP= 18.9 C = 66.04 F		
RUN NO.	V= 106.0 KT	MAST CO= .000207	TEMP U60= 36.9 C = 98.45 F		
	NZ= 1.025 G	OMEGA= 34.081 RAD/SEC	CAN TEMP= 30.0 C = 86.00 F		
TIME	64430.45	CLP= .00403	RPM/324= 1.004		
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.6	A1= -.5	R1= 4.7	PEAK-TO-PEAK= 9.5
	TEETER ANG (DEG)	A0= .2	A1= -1.3	B1= -.1	PEAK-TO-PEAK= 2.5
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DFG)	TORSION .449 (N-M/DEG)
MEAN	43726.	494.	-3208.	-2689.	-456.
HARMONIC-1	2934./ -24.8	600./ -32.6	121./ -39.4	2213./ -36.0	327./ -50.9
2	555./ 66.1	107./ 55.7	27./ -59.7	1459./ -55.3	140./ -51.8
3	1521./ 46.5	386./ 44.0	51./ 53.2	265./ -32.2	46./ 19.2
4	536./ 43.2	290./ 43.3	104./ 31.6	301./ 68.6	53./ 42.0
5	89./ -4.7	10./ -28.0	16./ 66.2	135./ -12.1	23./ 8.2
6	882./ -1.2	465./ -1.3	133./ -4.0	107./ -46.3	13./ -88.7
7	319./ 55.9	169./ 60.6	64./ 62.1	96./ 23.2	8./ 36.5
8	143./ 41.8	73./ 15.8	30./ 24.3	53./ -68.8	7./ -89.6
9	47./ -42.1	62./ -12.7	20./ -12.8	42./ -64.1	7./ -31.2
10	97./ 35.8	144./ -4.4	73./ 2.2	97./ 33.0	5./ 88.8
11	90./ -40.8	21./ 79.8	9./ 52.1	32./ -72.6	9./ -17.9
12	112./ -3.6	80./ -6.4	44./ -.0	11./ -9.7	3./ -45.6
PEAK-TO-PEAK	10591.	2256.	745.	6549.	813.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2074.	-189.	-218.	-472.	-473.
HARMONIC-1	651./ -55.6	392./ -66.5	401./ -67.1	388./ -69.6	156./ -84.8
2	326./ -65.9	233./ -79.6	244./ -77.5	201./ -73.9	63./ -58.1
3	25./ 69.9	38./ 28.0	48./ 63.3	70./ 89.2	71./ 76.3
4	258./ 46.7	86./ 34.6	52./ 33.0	58./ 40.9	104./ 29.0
5	76./ -22.4	7./ 63.8	17./ 53.1	6./ 2.8	34./ 46.4
6	13./ 52.2	8./ 12.7	8./ -70.0	13./ -6.5	30./ -56.9
7	44./ 18.9	8./ 38.3	23./ 43.6	7./ -26.8	25./ -87.7
8	10./ 28.5	2./ -89.0	5./ 46.4	5./ -42.7	14./ -41.9
9	15./ -76.6	16./ -70.7	4./ -57.3	21./ -59.5	16./ -37.8
10	54./ -2.9	25./ 1.9	15./ -11.7	28./ 9.9	21./ 22.7
11	14./ 12.6	9./ -43.7	3./ 40.8	6./ -23.6	5./ -6.1
12	12./ -70.1	2./ -80.2	6./ -74.3	5./ -77.2	5./ -44.9
PEAK-TO-PEAK	2172.	1154.	1168.	1120.	665.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 079 AIRCRAFT TOTAL WT = 32018. N LOADED CG X= 5.03 M = 197.9 IN  
 RUN NO. 34 7198. LB Y= -.00 = -.0  
 TIME 66880.00 (SEC) Z= 1.88 = 74.1

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.79 KPA = 37.3 PSF  
 T. AIRSPFED= 108.3 KT STATIC PRES= 96.4 KPA = 2013. PSF  
 A/C MACH NO= .162 TOTAL TEMP= 294.6 DEG K = 530.3 DEG R  
 BODY ALPH-A= 1.4 DEG STATIC TEMP= 293.1 DEG K = 527.5 DEG R  
 BODY BETA= 1.5 DEG DENSITY= 1.15 KG/M3 = .00222 SLUG/FT3  
 SONIC SPEED= 343.8 M/SEC = 1128. FPS  
 RATE OF CLIMB= -263. M/MIN = -863. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.66	182.6	-0.092	55.40	181.8	-0.089	ROLL	-1.4	.025	-.095
Y	1.44	4.7	-.010	1.49	4.9	-.030	PITCH	-3.1	.130	-.019
Z	1.38	4.5	-1.506	1.39	4.5	-1.502	YAW	229.1	.025	-.040

CONTROL ANGLES M.R. COLL= 9.3 DEG HORIZ FIN= 7.1 DEG  
 A1= .4 DEG T.R. COLL= 1.7 DEG  
 B1= 2.7 DEG PEDAL POS= 2.0 DEG

ROTOR PARAMETERS SHAFT ALPHA= 1.4 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -1.3 DFG  
 TIP MAX-MACH= .82 DELTA PSI= -1.5 DEG  
 TIP MIN-MACH= .50  
 \*R MAX-MACH= .76 ENGINE POWER= 360. KW = 483. HP  
 \*R MIN-MACH= .43 THRUST FACTOR= .837E+07 N = .188E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 79 MU= .241 TOTAL CO= .000184 AMB TEMP= 19.9 C = 67.83 F  
 RUN NO. 34 V= 108.3 KT MAST CO= .000165 TFMP U60= 38.7 C = 101.72 F  
 TIME 66879.85 N7= 1.502 G OMEGA= 34.412 RAD/SEC CAN TEMP= 29.6 C = 85.30 F  
 CLP= .00559 RPM/324= 1.014

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.0 A1= -.5 B1= 3.0 PEAK-TO-PEAK= 6.2  
 TEETER ANG (DEG) A0= .1 A1= -.6 B1= .2 PEAK-TO-PEAK= 1.2

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	46219.	183.	-3346.	-2293.	-463.
HARMONIC-1	4261./ 11.6	800./ 13.0	145./ 8.0	1652./ -39.9	303./ -59.8
2	196./ 38.9	134./ -31.3	61./ 64.6	980./ -26.0	97./ -10.4
3	2181./ 38.1	521./ 41.9	78./ 55.7	235./ 19.5	34./ 68.3
4	451./ 71.0	283./ 52.1	130./ 38.8	305./ -79.7	75./ 52.8
5	725./ -22.6	168./ -29.5	31./ 1.7	85./ -6.7	22./ -66.8
6	2090./ -2.3	1221./ -5.7	361./ -4.7	215./ 48.0	51./ 43.7
7	468./ -1.5	199./ 16.4	64./ 13.7	159./ 46.5	19./ 36.6
8	20./ -56.5	27./ -56.2	20./ -33.9	26./ 5.8	5./ 86.3
9	149./ 62.6	198./ 68.3	70./ 60.8	106./ -78.3	4./ -68.5
10	45./ -79.4	204./ -17.0	100./ -21.7	106./ 28.9	15./ -21.2
11	91./ -69.0	28./ 75.3	24./ -54.9	23./ -65.2	4./ -2.4
12	160./ -33.3	82./ -2.4	41./ -9.5	11./ -14.5	12./ -61.4
PEAK-TO-PEAK	13374.	4774.	1384.	5163.	751.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-1736.	-205.	-277.	-584.	-630.
HARMONIC-1	443./ -28.7	392./ -63.4	418./ -65.9	426./ -70.2	253./ -85.9
2	224./ -39.6	220./ -69.5	258./ -68.3	254./ -71.9	123./ 89.1
3	139./ -16.3	72./ 7.2	58./ 40.5	77./ 80.9	97./ 89.3
4	327./ 58.1	114./ 46.3	62./ 47.4	74./ 53.5	147./ 36.1
5	131./ -27.7	29./ -43.3	21./ 71.9	33./ -26.5	51./ -80.0
6	121./ -55.5	13./ 54.4	9./ -14.6	17./ 78.0	26./ -57.8
7	82./ 56.3	21./ 69.7	43./ 72.7	9./ -66.0	61./ -69.9
8	9./ 52.7	6./ -61.6	8./ -8.7	9./ -46.9	21./ -22.2
9	41./ -88.5	30./ -84.5	13./ 76.5	33./ -66.9	30./ -50.0
10	52./ 11.9	24./ 24.5	12./ 22.8	29./ 22.0	27./ 14.2
11	9./ 31.3	4./ -2.1	3./ 27.7	5./ 87.2	12./ -46.3
12	33./ -51.9	11./ -36.1	13./ -78.2	6./ -19.8	4./ 69.8
PEAK-TO-PEAK	2029.	1206.	1304.	1302.	975.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 79 AIRCRAFT TOTAL WT = 31636. N  
 RUN NO. 41 7112. LB LOADED CG X= 5.02 M = 197.8 IN  
 TIME 07548.33 (SEC) Y= -.00 Z= -.0  
 Z= 1.89 = 74.5

## AERODYNAMIC FLIGHT STATE

T. AIRSPEED= 0.0 KT  
 A/C MACH NO= 0.000

BODY ALPHA= -49.4 DEG  
 BODY BETA= 45.4 DEG

DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 STATIC PRES= 102.1 KPA = 2132. PSF  
 TOTAL TEMP= 297.0 DEG K = 534.6 DEG R  
 STATIC TEMP= 297.0 DEG K = 534.6 DEG R  
 DENSITY= 1.20 KG/N3 = .00232 SLUG/FT3  
 DENSITY ALT= 238. M = 781. FT  
 SONIC SPEED= 346.1 M/SEC = 1135. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)	
X	0.00	0.0	0.00	0.0	-0.001	ROLL	-.7	.003	-.027
Y	0.00	0.0	0.00	0.0	-0.008	PITCH	-.7	-.007	.003
Z	0.00	0.0	-1.024	0.00	0.0	YAW	342.7	.039	-.019

## CONTROL ANGLES

M.R. COLL= 10.0 DEG  
 A1= -1.5 DEG  
 B1= -.3 DEG HORIZ FIN= 6.4 DEG  
 T.R. COLL= 9.6 DEG  
 PEDAL POS= 9.2 DEG

## ROTOR PARAMETERS

HOVER TIP MACH= .65	SHAFT ALPHA= 0.0 DEG	HUB HEIGHT = 1.9 R
TIP MAX-MACH= .65	CONTROL ALPHA= .3 DEG	
TIP MIN-MACH= .55	DELTA PSI= 0.0 DEG	
.9K MAX-MACH= .58		
.9R MIN-MACH= .58	THRUST FACTOR= .849E+07 N = .191E+07 LB	

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 79 MU=0.000 TOTAL CO= .000296 AMB TEMP= 23.9 C = 74.96 F  
 RUN NO. 41 V= 0.0 KT MAST CO= .000263 TEMP U60= 39.9 C = 103.75 F  
 NZ= 1.024 G QMEGA= 33.633 RAD/SEC CAN TEMP= 31.9 C = 89.47 F  
 TIME 07548.15 CLP= .00373 RPM/324= .997

ROTOR ANGLES THETA 3/4 (DEG) AO= 7.6 A1= -1.7 B1= -.4 PEAK-TO-PEAK= 3.4  
 TEETER ANG (DEG) AO= .1 A1= 1.0 B1= -1.0 PEAK-TO-PEAK= 2.7

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	40431.	1022.	-2965.	-2957.	-430.
HARMONIC-1	1689./ -32.8	458./ -42.0	131./ -49.4	931./ -65.1	23./ -23.9
2	815./ 51.9	182./ 56.0	60./ -80.1	304./ 11.5	34./ 35.1
3	463./ -6.0	48./ -16.5	1./ -21.4	49./ -73.8	23./ -39.6
4	191./ -48.2	95./ -72.0	29./ -60.3	28./ -14.1	10./ -42.9
5	35./ -16.8	31./ 79.5	18./ 78.4	56./ 12.5	17./ 43.2
6	312./ -22.6	112./ -21.7	51./ -28.6	28./ 10.7	4./ -42.7
7	94./ 7.1	46./ -43.9	3./ -58.7	51./ 84.3	4./ 64.0
8	144./ 5.9	27./ -86.9	19./ 65.8	24./ -7.1	3./ -21.3
9	122./ 54.9	29./ -70.0	9./ -54.3	35./ 76.9	4./ -5.3
10	75./ -17.7	9./ 21.3	14./ -72.4	40./ -69.5	4./ -52.1
11	20./ 69.8	37./ 52.5	9./ 73.4	24./ -59.7	5./ -88.9
12	15./ 68.6	17./ -73.4	13./ 86.1	10./ -10.3	3./ 4.0
PEAK-TO-PEAK	3909.	1292.	481.	2270.	163.

BEAM .174	BEAM .350	BEAM .449	BEAM .600	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN	-1120.	-78.	-72.	-263.	-335.
HARMONIC-1	42./ 44.1	36./ -10.0	54./ -18.3	98./ -30.5	94./ -51.3
2	68./ 24.6	64./ -4.2	72./ -12.3	100./ -19.3	95./ -38.1
3	44./ -29.9	40./ -35.6	18./ -45.0	11./ -85.5	21./ 27.1
4	27./ -69.1	14./ -84.6	5./ 45.0	5./ 14.5	17./ 43.7
5	6./ -54.5	5./ 40.5	11./ -3.8	1./ -82.6	16./ 37.9
6	15./ 88.6	1./ 20.9	9./ -70.6	7./ -66.6	25./ -61.6
7	28./ -71.5	6./ -25.8	15./ -83.9	15./ 75.6	22./ 75.7
8	10./ -30.1	5./ -67.8	5./ -72.6	5./ -79.3	4./ 3.7
9	8./ 65.4	5./ -78.5	5./ 66.0	4./ -56.4	7./ -54.9
10	19./ 78.3	16./ -87.3	12./ 75.5	19./ -81.4	12./ -83.6
11	8./ 44.8	7./ 88.8	3./ 26.6	6./ 84.2	6./ -81.4
12	6./ 6.9	4./ 33.0	3./ -23.1	4./ 32.4	5./ -2.4
PEAK-TO-PEAK	338.	211.	256.	381.	355.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 36718. N LOADED CG X= 5.02 M = 197.6 IN  
 RUN NO. 2 .8255. LB Y= -.00 \* -.0  
 TIME +9685.20 (SEC) Z= 1.82 \* 71.8

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 T. AIRSPEED= 0.0 KT STATIC PRES= 101.9 KPA = 2128. PSF  
 A/C MACH NO= 0.003 TOTAL TEMP= 296.5 DEG K = 533.6 DEG R  
 BODY ALPHA= -2.9 DEG DENSITY= 1.20 KG/M3 = .00232 SLUG/FT3  
 BODY BETA= .0 DEG DENSITY ALT= 239. M = 783. FT  
 SONIC SPEED= 345.7 M/SEC = 1134. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC <sup>2</sup> )	
X	0.00	0.0	0.00	0.0	-0.018	ROLL	-1.3	.007	-.018
Y	0.00	0.0	0.00	0.0	.026	PITCH	-1.1	.006	.011
Z	0.00	0.0	-1.025	0.00	-1.025	YAW	22.3	-.006	.054

CONTROL ANGLES M.R. COLL= 11.3 DEG HURIZ FIN= 6.3 DEG  
 A1= -1.9 DEG T.R. COLL= 9.1 DEG  
 B1= -1.5 DEG PEDAL POS= 8.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= 0.0 DEG HUB HEIGHT = 1.9 R  
 HOVER TIP MACH= .66 CONTROL ALPHA= 1.5 DEG  
 TIP MAX-MACH= .66 DELTA PSI= 0.0 DEG  
 TIP MIN-MACH= .56  
 .9R MAX-MACH= .59  
 .9R MIN-MACH= .59 THRUST FACTOR= .866E+07 N = .195E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 80 MU=0.000 TOTAL CQ= .000351 AMB TEMP= 23.3 C = 73.94 F  
 RUN NO. 2 V= 0.0 KT MAST CQ= .000318 TEMP U60= 37.4 C = 99.23 F  
 TIME 49686.13 NZ= 1.025 G OMEGA= 34.150 RAD/SEC CAN TEMP= 40.0 C = 104.06 F  
 CLP= .00424 RPM/324= 1.007

ROTOR ANGLES THETA 3/4 (DEG) A0= 8.5 A1= -1.8 B1= -1.3 PEAK-TO-PEAK= 4.3  
 TEETER ANG (DEG) A0= .4 A1= 1.1 B1= -1.6 PEAK-TO-PEAK= 3.7

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	40110.	975.	-2796.	-3027.	-427.
HARMONIC-1	208./ -59.5	94./ -36.0	65./ -26.5	1425./ -34.4	23./ -30.2
2	373./ 77.3	109./ -83.4	10./ -81.6	438./ 24.6	53./ 51.2
3	3094./ 37.7	714./ 35.2	114./ 19.0	179./ 17.9	26./ 70.1
4	765./ 46.2	414./ 52.0	165./ 54.0	342./ 73.7	79./ 35.5
5	433./ -31.9	158./ -38.6	46./ -16.3	11./ 55.8	22./ -16.0
6	900./ -67.2	487./ 87.9	136./ -84.6	198./ 34.4	25./ 44.2
7	390./ 79.3	222./ 73.1	73./ 84.3	69./ 84.5	5./ 40.0
8	218./ 55.5	97./ 52.4	31./ 50.5	14./ 15.3	3./ -22.7
9	154./ 31.4	182./ -14.5	88./ -15.7	18./ 62.3	3./ -18.4
10	42./ 13.5	118./ -21.9	45./ -23.1	138./ -39.3	22./ -8.2
11	113./ 73.8	9./ 35.5	8./ 83.5	44./ -26.3	3./ -25.2
12	131./ 23.3	73./ 44.3	44./ 25.2	31./ 9.8	7./ -86.4
PEAK-TU-PEAK	8880.	3054.	997.	3798.	311.

BEAM .174	BEAM .350	BEAM .449	BEAM .603	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN	-937.	-9.	-32.	-229.	-321.
HARMONIC-1	75./ -76.6	5./ 42.7	21./ -69.1	58./ -59.2	67./ -37.3
2	84./ 32.8	57./ 26.1	91./ 30.1	106./ 43.4	58./ -64.6
3	110./ 33.8	125./ 35.2	108./ 35.9	73./ 26.9	63./ -50.4
4	202./ 62.3	110./ 57.2	44./ 51.6	61./ 83.9	159./ 82.6
5	62./ 29.1	21./ -1.7	13./ 32.2	44./ 13.4	18./ -60.0
6	62./ 21.3	17./ -56.3	27./ 31.6	36./ -6.1	46./ 22.1
7	33./ 80.2	6./ -18.0	19./ 85.8	10./ 21.1	13./ 63.7
8	17./ 27.9	4./ -82.4	11./ 11.8	7./ -26.8	15./ -57.0
9	3./ -51.7	7./ -6.7	5./ -40.8	11./ .6	8./ -3.5
10	34./ -46.4	28./ -64.6	17./ -58.4	33./ -52.2	24./ -44.3
11	8./ 9.7	14./ -26.1	5./ -79.9	11./ -25.1	7./ -1.2
12	20./ -33.3	16./ -45.9	10./ -35.1	20./ -43.0	12./ -13.7
PEAK-TU-PEAK	607.	471.	402.	405.	642.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35652. N  
 RUN NO. 19 8015. LB  
 TIME 51315.90 (SEC)

LOADED CG X= 5.04 M = 198.4 IN  
 Y= -.00 M = -.0  
 Z= 1.83 M = 72.0

AERODYNAMIC FLIGHT STATE  
 T. AIRSPEED= 111.9 KT  
 A/C MACH NO= .167  
 BODY ALPHA= 7.0 DEG  
 BODY BETA= 2.2 DEG  
 DYNAMIC PRES= 1.96 KPA = 41.0 PSF  
 STATIC PRES= 99.2 KPA = 2072. PSF  
 TOTAL TEMP= 295.1 DEG K = 531.1 DEG R  
 STATIC TEMP= 293.4 DEG K = 528.1 DEG R  
 DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 DENSITY ALT= 403. M = 1323. FT  
 SONIC SPEED= 344.0 M/SEC = 1128. FPS  
 RATE OF CLIMB= -601. M/MIN = -1972. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SFC)	ANG ACC (RAD/SEC2)		
X	57.10	187.3	-105	56.49	185.3	-102	ROLL	-3.0	.035	.123
Y	2.17	7.1	-.008	2.24	7.3	.016	PITCH	-3.2	.297	-.014
Z	7.01	23.0	-2.008	7.03	23.1	-1.990	YAW	137.0	.017	-.003

CONTROL ANGLES      M.R. COLL= 9.8 DEG      HORIZ FIN= 6.9 DEG  
 A1= 1.2 DEG      T.R. COLL= 1.8 DEG  
 B1= 2.1 DEG      PEDAL POS= 2.6 DEG

ROTOR PARAMETERS  
 HOVER TIP MACH= .67      SHAFT ALPHA= 7.1 DEG  
 CONTROL ALPHA= 5.0 DEG  
 TIP MAX-MACH= .83      DELTA PSI= -2.3 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .77      ENGINE POWER= 285. KW = 383. HP  
 .9R MIN-MACH= .43      THRUST FACTOR= .875E+07 N = .197E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .246	TOTAL CO= .000136	AMB TEMP= 20.3 C = 68.46 F		
RUN NO.	V= 111.9 KT	MAST CO= .000105	TEMP U60= 38.9 C = 102.05 F		
TIME	NZ= 1.990 G	OMEGA= 34.950 RAD/SEC	CAN TEMP= 31.9 C = 89.47 F		
	CLP= .00783	RPM/324= 1.030			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 6.8 A0= .3	A1= .1 A1= .0	B1= 1.7 B1= 1.0	PEAK-TO-PEAK= 3.7 PEAK-TO-PEAK= 2.0
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	51930.	-595.	-3377.	-2002.	-396.
HARMONIC-1	7016./ 1.6	1584./ 12.3	277./ 16.2	1713./ -7.4	241./ -45.2
2	785./ -2.2	531./ -37.5	121./ -47.0	619./ 39.0	66./ 29.3
3	3274./ 11.6	703./ 13.1	89./ 30.7	458./ 69.4	42./ 51.2
4	291./ -73.9	132./ 25.4	118./ 14.7	310./ -86.5	47./ -22.5
5	678./ -1.6	216./ .7	68./ 19.5	217./ 16.0	48./ 88.2
6	1122./ -20.9	582./ -25.3	175./ -24.9	260./ 77.6	58./ -86.9
7	57./ 40.0	97./ 76.9	44./ 42.4	110./ 65.0	38./ -48.6
8	111./ -4.3	61./ 22.0	54./ 8.9	62./ -29.8	29./ -49.7
9	88./ 64.7	64./ -79.4	25./ -78.9	77./ 17.7	22./ -26.7
10	227./ 35.1	161./ -16.2	64./ -16.2	49./ -68.7	23./ 4.7
11	184./ 31.5	17./ 24.4	10./ -1.1	46./ -2.2	3./ -32.7
12	111./ 84.0	28./ 23.9	7./ 16.8	49./ 60.6	6./ 10.0
PEAK-TO-PEAK	17177.	5033.	1288.	4907.	780.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DFG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1228.	-194.	-292.	-667.	-796.
HARMONIC-1	471./ 5.7	407./ -60.8	463./ -66.5	520./ -70.7	371./ -85.9
2	177./ 62.5	219./ -80.8	270./ -69.0	286./ -65.1	172./ -72.8
3	352./ -5.4	142./ -11.7	93./ 8.6	52./ 41.9	49./ 78.0
4	377./ 31.1	114./ 16.2	52./ 15.6	91./ 31.2	185./ 27.3
5	114./ -18.8	22./ -41.6	10./ 74.7	36./ -41.8	64./ -79.8
6	83./ -72.7	10./ -37.1	19./ 13.8	23./ 83.6	62./ -17.9
7	116./ 45.0	25./ 43.4	36./ 59.2	6./ 28.2	42./ -54.6
8	65./ 42.6	7./ -60.3	14./ 57.2	6./ 6.2	21./ -22.2
9	55./ 30.6	34./ -4.1	12./ -14.7	40./ 5.7	43./ 8.2
10	65./ 56.7	20./ 53.6	18./ 33.3	25./ 51.0	20./ 44.3
11	28./ -82.0	12./ -16.9	7./ 79.8	7./ -74.3	3./ -3.6
12	34./ -12.3	13./ 14.1	16./ -15.3	13./ -6.5	4./ 58.4
PEAK-TO-PEAK	2378.	1313.	1402.	1381.	1338.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35480. N LOADED CG X= 5.04 M = 198.3 IN  
 RUN NO. 21 7977. LB Y= -.00 = -.0  
 TIME 51557.70 (SFC) Z= 1.83 = 72.1

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.78 KPA = 37.2 PSF  
 STATIC PRES= 99.5 KPA = 2077. PSF  
 T. AIRSPEED= 106.7 KT TOTAL TEMP= 295.7 DEG K = 532.2 DEG R  
 A/C MACH NO= .160 STATIC TEMP= 294.2 DEG K = 529.5 DEG R  
 BODY ALPHA= -2.7 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 BODY BETA= .5 DEG DENSITY ALT= 406. M = 1333. FT  
 SONIC SPEED= 344.4 M/SEC = 1130. FPS  
 RATE OF CLIMB= -237. M/MIN = -778. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.85	179.9	-0.071	54.67	179.4	-0.079	ROLL	43.7	.014	-.046
Y	.48	1.6	.008	.50	1.6	-.004	PITCH	-5.7	.084	.039
Z	-2.59	-8.5	-1.161	-2.59	-8.5	-1.159	YAW	327.3	.130	-.034

CONTROL ANGLES M.R. COLL= 10.1 DEG HORIZ FIN= 7.5 DEG  
 A1= .4 DEG T.R. COLL= .9 DEG  
 B1= 3.7 DEG PEDAL POS= 1.1 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.7 DEG  
 HOVER TIP MACH= .65 CONTROL ALPHA= -6.4 DEG  
 TIP MAX-MACH= .81 DELTA PSI= -.5 DEG  
 TIP MIN-MACH= .49  
 .9R MAX-MACH= .75 ENGINE POWER= 408. KW = 548. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .842E+07 N = .189E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 80 MU= .241 TOTAL CO= .000211 AMB TEMP= 21.0 C = 69.80 F  
 RUN NO. 21 V= 106.7 KT MAST CO= .000200 TEMP U60= 39.2 C = 102.50 F  
 TIME 51557.55 NZ= 1.159 G OMEGA= 33.924 RAD/SEC CAN TEMP= 30.8 C = 87.39 F  
 CLP= .00478 RPM/324= 1.000

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.9 A1= -.5 B1= 4.0 PEAK-TO-PEAK= 8.4  
 TEETER ANG (DEG) A0= .4 A1= -.7 B1= -.0 PEAK-TO-PEAK= 1.2

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	43426.	387.	-3045.	-2698.	-489.
HARMONIC-1	4038./ -21.9	842./ -26.0	171./ -31.4	2107./ -36.1	320./ -50.1
2	1062./ -83.1	213./ 83.2	33./ -53.1	1483./ -43.5	138./ -37.0
3	1641./ 53.5	421./ 55.4	57./ 71.5	196./ -7.4	37./ 50.2
4	570./ 69.6	316./ 62.4	122./ 49.3	344./ -86.2	62./ 66.8
5	430./ 21.4	129./ 20.1	51./ 56.1	115./ 7.3	33./ 51.9
6	991./ -7.6	598./ -9.2	169./ -10.7	145./ 53.1	32./ 43.5
7	150./ 31.1	136./ -3.0	49./ 6.8	25./ -76.6	8./ 76.2
8	113./ 85.1	43./ 75.4	14./ -82.9	82./ 28.7	7./ -35.4
9	40./ 79.9	163./ 67.4	72./ 65.2	96./ -64.9	2./ 12.7
10	42./ -57.4	27./ 49.8	18./ -14.4	49./ 70.8	3./ -29.9
11	23./ -0.1	34./ -41.2	12./ 54.5	37./ 18.9	5./ -46.8
12	126./ -4.5	106./ -2.1	60./ 1.7	35./ -45.?	5./ -59.3
PEAK-TO-PEAK	11070.	3175.	952.	6411.	750.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-1969.	-256.	-292.	-554.	-546.
HARMONIC-1	633./ -47.4	419./ -64.6	424./ -66.4	426./ -68.2	213./ -83.5
2	387./ -56.3	264./ -71.3	282./ -69.1	241./ -67.3	92./ -67.7
3	31./ -.5	51./ 28.6	58./ 59.6	72./ -87.9	82./ -89.1
4	307./ 71.8	99./ 56.6	56./ 51.7	76./ 65.3	138./ 49.4
5	105./ -28.7	14./ -81.4	23./ 63.8	12./ -24.9	53./ 83.7
6	90./ -37.2	15./ 55.9	16./ 21.8	9./ 61.3	27./ -64.7
7	11./ -52.5	12./ -62.2	23./ -60.4	9./ -1.7	43./ -23.5
8	42./ 65.4	8./ -84.8	11./ 37.2	10./ -14.2	23./ 19.7
9	55./ -65.6	27./ -64.0	15./ -62.0	31./ -49.5	26./ -34.3
10	26./ 30.8	20./ 63.2	10./ 27.5	19./ 59.2	18./ 54.8
11	13./ 26.9	5./ 26.6	4./ -21.8	5./ -5.5	2./ -16.3
12	13./ -1.8	2./ -24.4	3./ -67.3	1./ 18.0	1./ -8.2
PEAK-TO-PEAK	2172.	1284.	1263.	1280.	829.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35459. N  
 RUN NO. 23 7972. LB  
 TIME 51576.70 (SEC) LOADED CG X= 5.04 M = 198.3 TN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.1

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.82 KPA = 38.0 PSF  
 T. AIRSPEED= 107.3 KT STATIC PRES= 100.6 KPA = 2101. PSF  
 A/C MACH NO= .160 TOTAL TEMP= 296.5 DEG K = 533.8 DEG R  
 BODY ALPHA= 2.2 DEG STATIC TEMP= 295.0 DEG K = 531.0 DEG R  
 BODY BETA= -1.9 DEG DENSITY= 1.19 KG/M3 = .00231 SLUG/FT3  
 DENSITY ALT= 320. M = 1050. FT  
 SONIC SPEED= 344.9 M/SEC = 1132. FPS  
 RATE OF CLIMB= -603. M/MIN = -1978. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.15	180.9	-1.07	54.70	179.5	-1.09	ROLL	52.5	.052	.054
Y	-1.87	-6.1	.039	-1.77	-5.8	.044	PITCH	-10.7	.220	-.000
Z	2.14	7.0	-1.664	2.14	7.0	-1.654	YAW	171.9	.150	-.046

CONTROL ANGLES M.R. COLL= 10.0 DEG HORIZ FIN= 6.9 DEG  
 A1= .6 DEG T.R. COLL= -.2 DEG  
 B1= 2.1 DEG PEDAL POS= -.5 DEG

ROTOR PARAMETERS SHAFT ALPHA= 2.2 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= .1 DEG  
 TIP MAX-MACH= .82 DELTA PSI= 1.9 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .76 ENGINE POWER= 300. KW = 402. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .874E+07 N = .196E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .239	TOTAL CQ= .000146	AMB TEMP= 21.9 C = 71.34 F		
RUN NO.	V= 107.3 KT	MAST CQ= .000132	TEMP U60= 39.2 C = 102.50 F		
	NZ= 1.654 G	OMEGA= 34.494 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
TIME 51576.55	CLP= .00657	RPM/324= 1.017			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.6	A1= -.5	B1= 2.5	PEAK-TO-PEAK= 5.3
	TEETER ANG (DEG)	A0= .3	A1= -.4	B1= .8	PEAK-TO-PEAK= 1.9
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	48081.	-139.	-3129.	-2338.	-484.
HARMONIC-1	6218./ 15.1	1277./ 20.5	221./ 14.4	1667./ -25.5	291./ -51.5
2	419./ 5.3	332./ -14.1	96./ -66.6	817./ 16.3	105./ 39.3
3	2782./ 58.8	653./ 60.9	95./ 74.0	438./ 65.7	58./ 83.4
4	115./ 74.4	218./ 67.8	144./ 64.5	381./ -38.2	71./ 89.5
5	665./ 4.1	201./ -18.6	36./ -20.6	9./ 24.3	30./ -3.0
6	1955./ 40.8	1156./ 35.4	335./ 36.0	414./ -87.6	80./ -90.0
7	173./ 66.9	120./ -56.6	42./ -63.3	216./ -55.4	31./ -53.9
8	123./ .9	85./ 18.2	39./ 9.4	47./ 28.0	14./ -16.7
9	103./ 8.1	133./ -47.8	61./ -54.0	102./ 27.4	4./ 61.5
10	48./ -72.0	135./ 71.4	79./ 52.6	119./ -57.2	11./ 74.9
11	81./ 80.8	39./ -31.6	37./ 16.4	22./ 45.0	3./ -66.3
12	114./ 78.7	28./ -85.4	8./ 27.7	24./ 5.1	8./ 25.1
PEAK-TO-PEAK	17712.	6076.	1429.	5531.	764.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1547.	-227.	-305.	-639.	-708.
HARMONIC-1	510./ -3.3	417./ -52.0	449./ -55.7	477./ -59.4	303./ -75.5
2	216./ -2.3	217./ -43.3	270./ -42.4	271./ -48.0	157./ -72.8
3	226./ 20.9	106./ 36.0	78./ 61.8	78./ -71.7	105./ -56.3
4	417./ -79.3	138./ 87.2	71./ 88.9	103./ -82.1	191./ 87.2
5	93./ 3.1	23./ 1.0	26./ -42.2	25./ 18.1	74./ -32.9
6	136./ 3.2	24./ -78.4	14./ 58.6	19./ -64.0	36./ -30.1
7	93./ -44.2	30./ -51.1	50./ -32.7	10./ 18.0	70./ -1.7
8	18./ 11.7	8./ 10.0	14./ 33.4	12./ 9.8	25./ 21.2
9	50./ 18.0	41./ 25.1	15./ -8.9	44./ 33.5	36./ 35.2
10	61./ -64.6	29./ -50.2	13./ -53.2	28./ -53.9	18./ -67.2
11	14./ 16.2	3./ 65.3	5./ 19.1	4./ -89.8	9./ 22.3
12	16./ -88.9	5./ -76.3	10./ 82.3	7./ -52.9	7./ 5.5
PEAK-TO-PEAK	2427.	1310.	1377.	1476.	1204.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35144. N  
 RUN NO. 27 7901. LB  
 TIME 52085.20 (SEC)

LOADED CG X= 5.04 M = 198.3 TN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE

T. AIRSPFED= 106.3 KT	DYNAMIC PRES= 1.76 KPA = 36.8 PSF
A/C MACH NO= .159	STATIC PRES= 98.9 KPA = 2066. PSF
	TOTAL TEMP= 294.9 DEG K = 530.8 DEG R
	STATIC TEMP= 293.4 DEG K = 528.1 DFG R
BODY ALPHA= .1 DEG	DENSITY= 1.18 KG/M3 = .00228 SLUG/FT3
BODY BETA= 2.1 DEG	DENSITY ALT= 436. M = 1432. FT
	SONIC SPEED= 344.0 M/SEC = 1128. FPS
	RATE OF CLIMB= -124. M/MIN = -408. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.63	179.2	-0.062	54.44	178.6	-0.066	ROLL	-44.1	.000	.031
Y	1.95	6.4	-.012	1.96	6.4	-.003	PITCH	-3.5	.093	.020
Z	.10	.3	-1.253	.11	.4	-1.251	YAW	12.0	-.118	-.002

CONTROL ANGLES

M.R. COLL= 9.9 DEG	HORIZ FIN= 7.6 DEG
A1= .5 DEG	T.R. COLL= 2.9 DFG
B1= 4.0 DEG	PEDAL POS= 3.7 DFG

ROTOR PARAMETERS

HOVER TIP MACH= .65	SHAFT ALPHA= .1 DEG
	CONTROL ALPHA= -3.9 DEG
TIP MAX-MACH= .81	DELTA PSI= -2.1 DEG
TIP MIN-MACH= .49	
.9R MAX-MACH= .75	ENGINE POWER= 396. KW = 531. HP
.9R MIN-MACH= .43	THRUST FACTOR= .833E+07 N = .187E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 80	MU= .242	TOTAL CQ= .000209	AMB TEMP= 20.3 C = 68.45 F		
RUN NO. 27	V= 106.3 KT	MAST CQ= .000194	TEMP U60= 38.8 C = 101.87 F		
TIME 52085.05	NZ= 1.251 G	OMEGA= 33.618 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
	CLP= .00522	RPM/324= .991			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.7	A1= -.3	B1= 4.3	PEAK-TO-PEAK= 8.8
	TEETER ANG (DEG)	A0= .3	A1= -.9	B1= .3	PEAK-TO-PEAK= 1.8
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	44352.	425.	-2976.	-2593.	-480.
HARMONIC-1	4126./ -10.8	807./ -14.2	167./ -19.5	1975./ -34.0	302./ -53.5
2	420./ 54.8	57./ 34.4	31./ -2.5	1480./ -48.1	148./ -40.5
3	1986./ 42.2	476./ 42.6	71./ 46.8	312./ 7.5	54./ 43.5
4	438./ 41.7	328./ 33.1	128./ 23.6	431./ 72.0	74./ 37.1
5	411./ -51.7	68./ -61.9	14./ 41.1	192./ -24.7	40./ 23.7
6	1295./ -40.2	727./ -39.9	206./ -40.5	209./ 4.2	46./ 6.7
7	287./ 50.0	128./ 80.7	32./ 72.6	100./ 1.5	17./ 36.9
8	276./ 34.1	153./ 35.8	48./ 45.7	32./ -46.0	9./ 70.8
9	139./ 76.5	121./ 33.6	56./ 33.3	60./ 56.4	1./ 82.4
10	135./ 44.7	73./ 14.3	29./ 3.8	51./ 1.8	5./ 32.7
11	103./ 67.0	51./ -65.4	44./ -73.0	48./ -81.7	4./ -9.2
12	99./ -50.9	90./ -75.5	47./ -71.1	19./ 40.3	13./ -85.3
PEAK-TO-PEAK	12177.	3673.	913.	6285.	822.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1929.	-260.	-304.	-571.	-570.
HARMONIC-1	625./ -43.1	423./ -66.2	434./ -68.8	435./ -72.9	220./ 86.4
2	343./ -61.9	259./ -80.0	279./ -77.9	224./ -76.4	63./ -76.7
3	48./ -18.4	54./ 12.1	54./ 45.8	64./ 81.0	70./ 72.9
4	383./ 45.2	123./ 30.9	60./ 24.1	92./ 39.0	149./ 27.5
5	157./ -46.5	24./ -65.2	18./ 40.5	24./ -46.0	47./ 77.9
6	81./ -68.9	10./ 13.3	4./ -10.5	9./ -15.6	34./ -82.8
7	56./ -20.1	7./ -15.8	17./ 27.9	9./ -73.5	35./ -88.1
8	25./ 41.6	5./ 54.7	10./ 8.6	9./ -36.2	25./ -14.5
9	33./ 46.4	17./ 53.9	8./ 22.9	18./ 88.1	19./ -60.6
10	26./ -9.5	19./ 7.0	12./ -4.0	24./ 7.2	20./ -.4
11	5./ -67.3	10./ -57.1	6./ -36.9	2./ -48.6	7./ -77.8
12	33./ 89.8	14./ -86.1	13./ 63.3	9./ -80.1	3./ -59.4
PEAK-TO-PEAK	2451.	1310.	1355.	1280.	797.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35110. N LOADED CG X= 5.04 M = 198.3 IN  
 RUN NO. 28 7894. LB Y= -.00 = -.0  
 TIME 52095.20 (SFC) Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.82 KPA = 38.1 PSF  
 T. AIRSPEED= 107.9 KT STATIC PRES= 99.5 KPA = 2079. PSF  
 A/C MACH NO= .161 TOTAL TEMP= 295.5 DEG K = 531.9 DEG R  
 BODY ALPH= 1.5 DEG STATIC TEMP= 294.0 DEG K = 529.2 DEG R  
 BODY BETA= 3.0 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 SONIC SPEED= 344.3 M/SEC = 1130. FPS  
 RATE OF CLIMB= -514. M/MIN = -1687. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.40	181.8	-0.088	55.10	180.8	-.092	ROLL	-54.8	-.078	.086
Y	2.91	9.6	-.033	2.76	9.0	-.011	PITCH	-10.5	.148	.005
Z	1.47	4.8	-1.460	1.48	4.9	-1.454	YAW	249.6	-.148	.041

CONTROL ANGLES M.R. COLL= 9.9 DEG HORIZ FIN= 7.2 DEG  
 AI= .5 DEG T.R. COLL= 2.9 DEG  
 BI= 2.9 DEG PEDAL POS= 3.7 DEG

ROTOR PARAMETERS SHAFT ALPHA= 1.5 DEG  
 HOVER TIP MACH= .65 CONTROL ALPHA= -1.4 DFG  
 TIP MAX-MACH= .82 DELTA PSI= -2.9 DEG  
 TIP MIN-MACH= .49 .9R MAX-MACH= .75 ENGINE POWER= 355. KW = 476. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .843E+07 N = .190E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 80 MU= .244 TOTAL CQ= .000183 AMB TEMP= 20.8 C = 69.53 F  
 RUN NO. 28 V= 107.9 KT MAST CQ= .000169 TEMP U60= 38.8 C = 101.87 F  
 NZ= 1.454 G OMEGA= 33.926 RAD/SEC CAN TEMP= 30.8 C = 87.39 F  
 TIME 52095.09 CLP= .00594 RPM/324= 1.000

ROTOR ANGLES THETA 3/4 (DEG) AO= 7.6 A1= -.3 B1= 3.2 PEAK-TO-PEAK= 6.5  
 TEETER ANG (DEG) AO= .4 A1= -.4 B1= .7 PEAK-TO-PEAK= 1.7

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	46088.	210.	-3001.	-2353.	-478.
HARMONIC-1	5488./ .1	1126./ 2.0	239./ -2.5	1774./ -30.5	279./ -57.0
2	417./ -39.6	238./ -53.2	61./ 63.3	1427./ -34.7	151./ -24.8
3	1873./ 28.9	463./ 33.4	62./ 41.8	389./ 15.0	53./ 57.4
4	416./ 46.5	282./ 22.9	143./ 13.3	418./ 79.6	81./ 36.6
5	671./ -42.3	123./ -49.5	24./ 15.6	191./ -13.6	43./ 61.5
6	1652./ -43.0	874./ -48.3	246./ -48.5	347./ 17.8	68./ 13.9
7	131./ -34.4	106./ 30.7	36./ 26.9	165./ 7.4	24./ 21.8
8	233./ -89.3	129./ -88.0	60./ -86.6	26./ -47.0	9./ 58.0
9	66./ 66.5	69./ 19.6	25./ 3.9	85./ 58.6	2./ -68.4
10	104./ -11.3	196./ -55.5	89./ -61.8	101./ -34.2	13./ -67.4
11	74./ -14.7	18./ 85.1	14./ -74.4	28./ -74.8	7./ 62.2
12	103./ 70.1	47./ -88.8	22./ 63.5	16./ 5.2	12./ 67.5
PEAK-TO-PEAK	14945.	4844.	1362.	6159.	833.

BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
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MEAN	-1741.	-250.	-314.	-623.	-646.
HARMONIC-1	610./ -23.9	440./ -64.2	459./ -68.6	454./ -75.7	273./ 80.9
2	302./ -49.1	251./ -76.7	281./ -75.7	249./ -76.3	80./ 86.7
3	112./ -40.7	62./ -17.4	53./ 23.9	70./ 57.4	82./ 68.7
4	413./ 44.4	129./ 26.4	63./ 26.8	95./ 37.0	168./ 24.3
5	187./ -42.6	31./ -67.9	26./ 39.5	44./ -50.0	59./ 78.8
6	126./ -67.0	15./ 13.3	16./ 1.7	12./ 60.9	39./ 76.6
7	82./ 4.1	19./ 19.2	42./ 32.8	11./ 89.0	67./ 73.8
8	14./ 40.5	10./ 89.3	7./ -28.8	16./ -69.5	30./ -60.5
9	45./ 46.8	32./ 63.2	17./ 25.3	32./ 81.2	31./ -77.9
10	39./ -43.3	23./ -26.8	8./ -67.4	28./ -21.2	28./ -29.0
11	8./ -38.4	2./ -21.5	6./ -83.7	4./ 40.6	13./ -84.3
12	44./ 80.6	14./ 69.5	14./ 46.7	10./ 86.4	2./ 40.1
PEAK-TO-PEAK	2726.	1414.	1408.	1360.	992.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 980 AIRCRAFT TOTAL WT = 35104. N LOADED CG X= 5.04 M = 198.3 IN  
 RUN NO. 29 7892. LB Y= -.00 = -.0  
 TIME 52099.50 (SEC) Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.84 KPA = 38.5 PSF  
 T. AIRSPFED= 108.3 KT STATIC PRES= 100.0 KPA = 2089. PSF  
 A/C MACH NO= .162 TOTAL TEMP= 296.0 DEG K = 532.7 DEG R  
 BODY ALPHA= 4.9 DEG STATIC TEMP= 294.4 DEG K = 530.0 DEG R  
 BODY BETA= 3.6 DEG DENSITY= 1.18 KG/M3 = .00230 SLUG/FT3  
 SONIC SPEED= 344.5 M/SEC = 1130. FPS  
 RATE OF CLIMB= -654. M/MIN = -2145. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.39	181.7	-104	54.93	180.2	-117	ROLL	-51.1	-.061	.118
Y	3.49	11.4	-.042	3.37	11.1	-.060	PITCH	-11.1	.224	.055
Z	4.76	15.6	-1.790	4.77	15.7	-1.779	YAW	211.2	-.144	.001

CONTROL ANGLES      M.R. COLL= 9.9 DEG      HORIZ FIN= 6.9 DEG  
 A1= .5 DEG      T.R. COLL= 2.3 DEG  
 B1= 2.1 DEG      PEDAL POS= 3.8 DEG

ROTOR PARAMETERS      SHAFT ALPHA= 5.0 DEG  
 HOVER TIP MACH= .66      CONTROL ALPHA= 2.8 DEG  
 TIP MAX-MACH= .82      DELTA PSI= -3.5 DEG  
 TIP MIN-MACH= .50      .9R MAX-MACH= .76      ENGINE POWER= 251. KW = 336. HP  
 .9R MAX-MACH= .76      .9R MIN-MACH= .43      THRUST FACTOR= .869E+07 N = .195E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 80 MU= .241      TOTAL CQ= .000123      AMB TEMP= 21.3 C = 70.28 F  
 RUN NO. 29 V= 108.3 KT      MAST CQ= .000108      TFMP UAO= 38.8 C = 101.87 F  
 TIME 52099.35 NZ= 1.779 G      OMEGA= 34.405 RAD/SEC      CAN TEMP= 30.8 C = 87.39 F  
 CLP= .00706 RPM/324= 1.014

ROTOR ANGLES      THETA 3/4 (DFG)      AO= 7.4      A1= -.4      B1= 2.4      PEAK-TO-PEAK= 5.3  
 TEETER ANG (DEG)      AO= .3      A1= -.0      B1= 1.0      PFAK-TO-PEAK= 2.0

ROTOR LOADS (AMP/PHASE)      DRAG BRACE      CHORD .449      CHORD .803      PITCH LINK      TORSION .449  
 (N-M/DEG)      (N-M/DEG)      (N-M/DEG)      (N-M/DEG)      (N-M/DEG)

MEAN	49941.	-265.	-3126.	-2127.	-458.
HARMONIC-1	7279./ 2.9	1500./ 6.4	296./ 2.1	1623./ -22.2	259./ -55.1
2	463./ 20.7	317./ -24.1	69./ -46.0	792./ -22.4	89./ -7.0
3	2921./ 20.6	679./ 25.0	107./ 36.0	506./ 32.0	60./ 50.9
4	466./ 51.5	330./ 17.1	167./ 7.7	412./ 81.5	68./ 21.4
5	680./ -36.0	114./ -53.3	16./ 25.1	190./ 3.0	52./ 70.8
6	1448./ -28.9	865./ -33.8	248./ -33.8	367./ 34.1	67./ 27.5
7	312./ -29.2	151./ 6.0	58./ 5.8	237./ 25.6	28./ 40.7
8	14./ 60.1	96./ 72.8	37./ 54.0	57./ 55.3	19./ 68.9
9	98./ 85.0	166./ -51.8	66./ -52.4	38./ -27.0	1./ -52.0
10	108./ 14.3	119./ -41.0	62./ -53.8	76./ 11.1	11./ -58.9
11	90./ -45.1	12./ -38.8	21./ -44.7	49./ -38.6	13./ -24.5
12	104./ -40.6	30./ -18.9	43./ -37.7	31./ 11.8	13./ -50.1
PFAK-TO-PEAK	17712.	5689.	1504.	5066.	691.

BEAM .174	BEAM .350	BEAM .449	BEAM .606	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN	-1481.	-234.	-316.	-658.	-742.
HARMONIC-1	659./ -11.8	445./ -62.3	477./ -67.1	491./ -73.0	319./ 84.0
2	218./ -37.6	210./ -67.1	250./ -65.0	241./ -67.6	113./ -89.2
3	240./ -13.0	113./ -5.8	86./ 14.0	78./ 54.1	91./ 68.1
4	416./ 31.2	137./ 17.4	67./ 28.1	91./ 26.4	176./ 22.5
5	192./ -47.8	36./ -60.9	23./ 53.8	46./ -46.4	82./ -87.5
6	126./ -60.3	19./ 39.1	16./ -1.3	15./ 77.4	45./ -88.9
7	110./ 22.7	33./ 30.9	55./ 39.6	6./ 70.2	68./ 78.7
8	49./ 4.7	11./ -14.9	16./ 38.2	8./ -77.1	24./ -81.3
9	34./ -35.1	23./ -45.1	6./ -23.4	25./ -43.3	24./ -44.6
10	74./ 3.7	22./ 8.5	20./ 8.8	27./ 1.5	20./ -11.2
11	11./ -59.3	11./ -14.1	5./ 53.5	9./ -15.0	7./ 50.6
12	36./ -37.7	13./ -26.6	15./ -77.4	15./ -31.7	7./ -3.5
PEAK-TO-PEAK	2726.	1386.	1408.	1320.	1151.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 35025. N  
 RUN NO. 31 7874. LB  
 TIME 52235.70 (SEC) LOADED CG X= 5.04 M = 198.3 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.92 KPA = 40.1 PSF  
 STATIC PRES= 99.7 KPA = 2082. PSF  
 T. AIRSPEED= 110.6 KT TOTAL TEMP= 295.8 DEG K = 532.4 DEG R  
 A/C MACH NO= .165 STATIC TEMP= 294.2 DEG K = 529.5 DEG R  
 BODY ALPH-A= 5.8 DEG DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 BODY BETA= 4.7 DEG DENSITY ALT= 384. M = 1259. FT  
 SONIC SPEED= 344.4 M/SEC = 1130. FPS  
 RATE OF CLIMB= -912. M/MIN = -2991. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SFC)	ANG ACC (RAD/SEC2)		
X	56.42	185.1	-124	55.91	183.4	-.139	ROLL	-48.2	-.080	-.204
Y	4.67	15.3	-.071	4.52	14.8	-.106	PITCH	-15.3	.253	.065
Z	5.70	18.7	-2.014	5.71	18.7	-1.999	YAW	147.9	-.144	.020

CONTROL ANGLES M.R. COLL= 10.4 DEG HORIZ FIN= 6.9 DEG  
 A1= .6 DEG T.R. COLL= 2.6 DEG  
 B1= 2.1 DEG PEDAL POS= 4.1 DEG

ROTOR PARAMETERS SHAFT ALPHA= 5.8 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= 3.8 DEG  
 TIP MAX-MACH= .83 DELTA PSI= -4.6 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .76 ENGINE POWER= 252. KW = 338. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .875E+07 N = .197E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .245	TOTAL CQ= .000123	AMB TEMP= 21.0 C = 69.87 F		
RUN NO.	V= 110.6 KT	MAST CQ= .000105	TEMP U60= 38.5 C = 101.24 F		
	NZ= 1.999 G	OMEGA= 34.620 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
TIME	CLP= .00784	RPM/324= 1.020			
ROTOR ANGLES	THETA 3/4 (DEG)	AO= 7.7	A1= -.5	B1= 2.2	PEAK-TO-PEAK= 4.9
	TEETER ANG (DEG)	AO= .3	A1= .5	B1= 1.0	PEAK-TO-PEAK= 2.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	50790.	-435.	-3240.	-1981.	-437.
HARMONIC-1	8968./ -4.0	1917./ 2.6	375./ 2.6	2019./ -3.7	254./ -37.2
2	456./ 86.6	422./ -62.6	90./ -83.5	658./ -41.9	72./ -42.3
3	3409./ 15.6	825./ 19.3	129./ 31.9	619./ 34.9	65./ 45.6
4	143./ 72.0	243./ -17.0	156./ -14.5	395./ 61.8	69./ 12.6
5	602./ -55.3	64./ -48.3	26./ 59.4	218./ 28.4	64./ 65.8
6	1488./ -57.8	833./ -64.5	249./ -65.6	372./ 31.5	59./ 19.1
7	394./ -54.2	210./ 2.4	102./ .9	234./ 19.6	20./ 63.5
8	69./ 37.8	146./ 36.8	75./ 24.3	96./ 51.6	21./ -85.2
9	65./ 42.9	199./ 66.3	74./ 60.0	86./ -3.3	18./ -49.8
10	166./ -27.7	17./ -20.6	18./ 39.9	116./ 24.7	6./ -64.5
11	128./ -50.4	72./ 49.2	43./ 55.9	54./ 73.0	12./ -50.8
12	19./ 49.2	57./ 48.1	31./ 63.1	29./ -35.7	15./ -66.9
PEAK-TO-PEAK	21033.	7145.	1826.	6253.	680.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1224.	-199.	-304.	-663.	-796.
HARMONIC-1	802./ -7.2	467./ -60.6	504./ -67.2	537./ -73.2	380./ 82.2
2	207./ -48.3	222./ -73.7	263./ -68.3	248./ -66.2	88./ -72.0
3	262./ -16.7	123./ -13.0	94./ 12.2	76./ 47.4	64./ 69.3
4	460./ 13.2	140./ -2.4	70./ 11.8	98./ 1.6	214./ 3.4
5	202./ -61.6	43./ -71.8	20./ 35.0	55./ -61.1	77./ 69.7
6	171./ -83.4	20./ 38.3	14./ -63.4	27./ 74.5	22./ -83.6
7	169./ 8.9	63./ 22.2	71./ 21.6	4./ 24.5	70./ 59.2
8	77./ -9.8	10./ -3.8	24./ 10.4	2./ 31.6	18./ -78.4
9	60./ -33.4	35./ -29.1	17./ -41.8	39./ -72.4	38./ -18.6
10	99./ -9.9	36./ -6.0	32./ -18.7	42./ -6.8	34./ -5.9
11	20./ -17.0	9./ -66.2	10./ -13.6	5./ -64.0	3./ 59.2
12	43./ -69.9	18./ -62.9	21./ 84.4	18./ -63.7	9./ -39.6
PEAK-TO-PEAK	3262.	1519.	1539.	1340.	1275.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 080 AIRCRAFT TOTAL WT = 34909. N LOADED CG X= 5.04 M = 198.3 TN  
 RUN NO. 33 7848. LB Y= -.00 = -.0  
 TIME 52435.20 (SEC) Z= 1.84 = 72.3

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.79 KPA = 37.4 PSF  
 T. AIRSPEED= 107.9 KT STATIC PRES= 97.0 KPA = 2026. PSF  
 A/C MACH NO= .162 TOTAL TEMP= 293.6 DEG K = 528.5 DEG R  
 BODY ALPHA= -1.6 DEG STATIC TEMP= 292.1 DEG K = 525.7 DEG R  
 BODY BETA= .6 DFG DENSITY= 1.16 KG/M3 = .00225 SLUG/FT3  
 SONIC SPEED= 343.2 M/SEC = 1126. FPS  
 RATE OF CLIMB= 32. M/MIN = 105. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.46	182.0	-0.052	55.47	182.0	-0.048	ROLL	.4	.013	-.024
Y	.56	1.8	.005	.59	1.9	-.000	PITCH	-1.1	-.004	-.019
Z	-1.58	-5.2	-1.071	-1.58	-5.2	-1.071	YAW	163.4	-.005	-.003

CONTROL ANGLES M.R. COLL= 9.9 DEG HORIZ FIN= 8.1 DEG  
 A1= .4 DEG T.R. COLL= 1.9 DEG  
 B1= 5.0 DEG PEDAL POS= 2.5 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.6 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -6.7 DEG  
 TIP MAX-MACH= .82 DELTA PSI= -.6 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .75 ENGINE POWER= 424. KW = 568. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .832E+07 N = .187E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .243	TOTAL CG= .000220	AMB TEMP= 18.9 C = 66.08 F		
RUN NO.	V= 107.9 KT	MAST CG= .000208	TEMP UND= 37.8 C = 100.00 F		
TIME	NZ= 1.071 G	OMEGA= 34.044 RAD/SEC	CAN TEMP= 30.4 C = 86.69 F		
	CLP= .00439	RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.9	A1= -.5	B1= 5.4	PEAK-TO-PEAK= 11.0
	TEETER ANG (DEG)	A0= .4	A1= -1.4	B1= -.2	PEAK-TO-PEAK= 2.8
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	43902.	387.	-3213.	-2834.	-480.
HARMONIC-1	3670./ -28.1	801./ -33.6	169./ -38.1	2423./ -36.5	338./ -48.7
2	498./ -82.1	79./ -83.3	35./ -39.3	1664./ -50.6	158./ -49.5
3	1833./ 40.8	442./ 38.1	65./ 42.6	252./ -27.9	55./ 23.2
4	563./ 77.8	278./ 61.3	101./ 42.3	301./ 71.6	56./ 56.7
5	210./ 43.7	56./ 57.5	30./ 74.5	126./ -8.9	15./ 5.7
6	766./ 17.4	454./ 10.6	130./ 11.2	125./ -36.2	16./ -61.7
7	208./ 45.5	118./ 86.9	39./ 87.7	48./ 45.1	8./ 61.8
8	167./ 67.4	69./ -84.1	22./ -85.4	56./ -72.7	4./ -67.1
9	67./ -19.5	145./ 15.5	54./ 22.5	30./ 81.3	5./ -42.9
10	157./ 81.6	150./ 29.5	80./ 39.3	87./ 49.9	7./ -36.0
11	41./ -78.9	36./ 58.2	19./ -3.1	34./ -82.2	6./ -49.6
12	37./ 31.3	75./ 15.1	43./ 16.1	6./ -67.3	4./ -50.3
PEAK-TO-PEAK	12173.	2910.	912.	7163.	895.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2107.	-258.	-281.	-529.	-490.
HARMONIC-1	753./ -55.9	424./ -67.1	420./ -67.7	408./ -70.0	166./ -85.9
2	386./ -59.3	266./ -74.9	281./ -72.7	234./ -69.0	85./ -54.5
3	48./ 56.5	60./ 21.4	47./ 56.8	70./ 82.6	77./ 78.4
4	279./ 56.7	91./ 43.5	53./ 37.5	71./ 57.6	120./ 39.3
5	80./ -18.8	6./ -61.7	22./ 51.5	10./ -7.7	39./ 50.4
6	16./ -87.4	5./ 56.8	8./ 90.0	9./ 8.4	31./ -56.7
7	26./ 37.8	10./ -83.1	21./ 70.5	5./ 1.9	31./ -65.2
8	2./ -52.7	2./ 50.0	5./ 85.5	6./ -37.8	18./ -25.6
9	26./ 81.9	14./ 75.0	6./ 90.0	19./ -69.7	18./ -50.9
10	44./ 5.8	28./ 13.4	15./ .6	31./ 18.7	24./ 21.5
11	5./ -48.3	7./ -88.2	3./ 46.6	5./ 82.4	2./ 38.3
12	13./ -53.9	4./ -83.6	6./ 69.9	4./ -51.6	1./ -58.9
PEAK-TO-PEAK	2426.	1257.	1275.	1239.	708.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 060 AIRCRAFT TOTAL WT = 34789. N  
RUN NO. 38 7821. LB  
TIME 52053.70 (SEC)

LOADED CG X= 5.04 M = 196.3 IN  
Y= -.00 = -.0  
Z= 1.84 = 72.3

## AERODYNAMIC FLIGHT STATE

T. AIRSPEED= 105.4 KT  
A/C MACH NO= .150

DYNAMIC PRES= 1.71 KPA = 35.0 PSF  
STATIC PRES= 97.0 KPA = 2026. PSF  
TOTAL TEMP= 243.8 DEG K = 528.8 DEG R  
STATIC TEMP= 292.3 DEG K = 526.2 DEG R

BODY ALPHA= 6.0 DEG  
BODY BETA= -.5 DEG

DENSITY= 1.16 KG/M3 = .00224 SLUG/FT3  
DENSITY ALT= 599. M = 1965. FT  
SONIC SPEED= 343.3 M/SEC = 1126. FPS  
RATE OF CLIMB= -506. M/MIN = -1659. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUF LIN VEL (M/S)	HUF LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)	
X	53.66	176.7	-1.131	53.45	175.4	-1.146	.4	-.012	.109
Y	-44	-1.4	.014	-47	-1.5	.636	-2.4	.202	.070
Z	6.22	20.4	-1.831	6.23	20.4	-1.822	283.0	.037	.056

## CONTROL ANGLES

M.R. COLL= 8.9 DEG  
A1= .8 DEG  
E1= 1.0 DEG

HORIZ FIN= 6.6 DEG  
T.R. COLL= .3 DEG  
PEDAL POS= 1.3 DEG

## ROTOR PARAMETERS

HOVER TIP MACH=	SHAFT ALPHA=	6.6 DEG
.66	CONTROLL ALPHA=	5.7 DEG
	TIP MAX-MACH=	.82
	TIP MIN-MACH=	.51
.98 MAX-MACH= .76	DELTA PSI=	.5 DEG
.98 MIN-MACH= .44	ENGINE POWER=	200. KW = 269. HP
	THRUST FACTOR=	.849E+07 N = .191E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 060 FU= .234  
V= 105.4 KT  
RUN NO. 38 MAST CQ= .000100  
TIME 52053.55 NZ= 1.622 G  
CLP= .00723 ÜMEGA= 34.620 RAD/SEC  
RPM/324= 1.020

AMB TEMP= 19.2 C = 66.49 F  
TEMP U60= 37.0 C = 98.68 F  
CAN TEMP= 29.6 C = 85.30 F

ROTOK ANGLES THETA 3/4 (DEG) AU= 6.4 A1= -.4 B1= 1.1 PEAK-TO-PEAK= 2.7  
TEETER ANG (DEG) AG= .3 A1= .5 B1= 1.4 PEAK-TO-PEAK= 2.6

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
(N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN HARMONIC-1	51449.	-626.	-3329.	-1656.	-401.
2	6902./ 12.9	1448./ 18.5	250./ 15.5	1314./ -10.1	218./ -46.9
3	1208./ -26.6	575./ -26.9	138./ -53.1	379./ 39.1	65./ 40.3
4	2963./ 42.0	687./ 45.4	106./ 62.3	497./ 54.7	50./ 60.0
5	206./ 43.9	265./ 34.5	139./ 34.8	300./ -70.5	68./ 61.0
6	561./ -10.3	149./ -32.5	19./ -24.8	147./ 30.9	27./ -56.9
7	1219./ 4.6	702./ -2.3	206./ -3.6	348./ 71.9	54./ 71.2
8	260./ -24.7	15./ 67.7	20./ 58.1	208./ 76.1	18./ -75.6
9	166./ -53.1	58./ -63.4	15./ -30.4	52./ -32.6	11./ -40.0
10	49./ -22.8	124./ 71.3	40./ 77.5	67./ 67.4	5./ 64.4
11	29./ -23.2	97./ 31.9	52./ 35.6	64./ -67.6	7./ -69.8
12	19./ -72.6	21./ 12.9	33./ 31.0	32./ -4.6	6./ 72.6
PEAK-TO-PEAK	93./ -51.0	11./ -57.2	12./ -80.7	20./ 46.8	6./ 61.5
	17694.	5694.	1327.	4019.	602.

BEAM .174	BEAM .350	BEAM .449	BEAM .606	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN HARMONIC-1	-1485.	-225.	-314.	-658.	-748.
2	523./ 4.5	395./ -53.2	438./ -57.4	464./ -61.7	300./ -53.1
3	130./ 7.9	169./ -40.1	204./ -38.6	213./ -43.0	130./ -70.6
4	320./ 11.2	124./ 19.5	84./ 38.5	52./ 87.1	90./ -70.2
5	437./ 60.1	137./ 50.5	62./ 62.2	98./ 56.9	172./ 55.2
6	132./ -6.0	36./ -29.8	21./ -70.1	36./ -15.3	71./ -41.1
7	101./ -9.0	17./ -77.4	8./ -85.2	17./ -48.0	36./ -19.0
8	116./ 84.9	27./ -80.1	47./ -79.2	4./ -8.7	45./ -38.2
9	51./ 75.9	7./ -70.1	15./ -61.1	1./ -74.3	14./ 14.1
10	39./ 54.7	23./ 50.0	5./ 68.9	24./ 52.6	22./ 56.0
11	68./ 68.9	20./ -86.3	20./ -82.9	23./ -82.3	19./ -87.0
12	17./ 85.2	6./ 48.9	7./ -86.6	4./ 47.4	6./ 10.9
PEAK-TO-PEAK	24./ 69.3	15./ 60.0	9./ 43.6	13./ 71.2	8./ -57.0
	2332.	1229.	1274.	1177.	1133.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36367. N LOADED CG X= 5.04 M = 198.4 IN  
 RUN NO. 3 8176. LB Y= -.00 M = -.0  
 TIME 49433.10 (SEC) Z= 1.83 M = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= .56 KPA = 11.7 PSF  
 T. AIRSPEED= 65.2 KT STATIC PRES= 81.3 KPA = 1698. PSF  
 A/C MACH NO= .099 TOTAL TEMP= 285.8 DEG K = 514.5 DEG R  
 BODY ALPHA= -.7 DEG STATIC TEMP= 285.3 DEG K = 513.5 DEG R  
 BODY BETA= 3.6 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 DENSITY ALT= 2136. M = 7007. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -71. M/MIN = -232. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	33.45	109.7	-0.025	33.45	109.7	-.022	ROLL	.0	-.005	-.017
Y	2.10	6.9	.006	2.09	6.9	.002	PITCH	-2.7	.002	-.014
Z	-.41	-1.4	-1.010	-.41	-1.4	-1.010	YAW	304.4	-.008	-.013

CONTROL ANGLES M.R. COLL= 9.3 DEG HORIZ FIN= 6.8 DEG  
 A1= -.4 DEG T.R. COLL= 2.1 DEG  
 B1= 2.3 DEG PEDAL POS= 2.6 DEG

ROTOR PARAMETERS SHAFT ALPHA= -.7 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -3.0 DEG  
 TIP MAX-MACH= .76 DELTA PSI= -3.6 DEG  
 TIP MIN-MACH= .57  
 .9R MAX-MACH= .70 ENGINE POWER= 354. KW = 475. HP  
 .9R MIN-MACH= .50 THRUST FACTOR= .712E+07 N = .160E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .147	TOTAL CQ= .000216	AMB TEMP= 12.1 C = 53.79 F		
RUN NO.	V= 65.2 KT	MAST CQ= .000204	TEMP U60= 32.6 C = 90.63 F		
TIME	NZ= 1.010 G	OMEGA= 33.987 RAD/SEC	CAN TEMP= 33.9 C = 92.94 F		
	CLP= .00504	RPM/324= 1.002			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.7	A1= -1.1	B1= 2.4	PEAK-TO-PEAK= 5.1
	TEETER ANG (DEG)	A0= .3	A1= -.2	B1= .3	PEAK-TO-PEAK= .7
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	45358.	-699.	-3961.	-1906.	-336.
HARMONIC-1	4861./ -8.7	1175./ -8.6	220./ -15.0	1255./ -3.7	140./ -40.7
2	264./ 7.1	86./ -62.2	64./ -13.6	406./ -4.5	35./ 1.7
3	772./ -18.3	164./ -25.6	72./ -26.1	291./ 32.1	65./ 84.7
4	305./ 13.5	231./ 1.3	100./ 6.2	150./ 36.4	40./ 28.5
5	180./ 32.6	29./ -86.5	12./ -41.6	121./ -13.1	13./ 20.7
6	279./ 86.7	112./ 56.4	50./ 45.0	52./ -80.7	14./ -69.3
7	67./ 31.0	62./ 77.7	15./ -80.3	63./ 62.4	3./ -33.0
8	54./ 55.5	22./ 44.3	15./ 51.8	40./ 25.8	3./ -13.6
9	15./ 38.9	60./ -27.8	28./ -25.2	23./ 87.4	2./ 33.5
10	77./ 55.9	98./ -14.2	58./ -21.0	191./ -64.2	24./ -31.8
11	44./ -6.5	35./ 58.2	16./ 40.0	57./ -34.4	13./ -89.9
12	98./ 72.0	15./ 30.0	12./ 70.8	22./ -82.1	9./ -11.3
PEAK-TO-PEAK	11949.	3136.	781.	3601.	414.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1988.	-98.	-153.	-458.	-459.
HARMONIC-1	391./ -31.9	176./ -87.6	192./ 87.1	182./ -80.1	77./ -87.3
2	146./ -8.2	112./ -18.6	140./ -16.7	212./ -13.0	136./ -12.6
3	58./ -6.0	13./ 5.0	34./ -15.9	73./ -42.7	139./ -21.1
4	222./ 18.3	74./ 7.3	46./ -.6	43./ 33.7	94./ 30.3
5	123./ -20.1	8./ 34.1	20./ -59.0	23./ -11.0	43./ -35.4
6	23./ -43.1	8./ -18.5	13./ 67.5	31./ 3.2	44./ 67.3
7	74./ 67.8	16./ 74.2	36./ 75.4	19./ 10.2	61./ 52.3
8	53./ 21.0	11./ 29.8	21./ 8.0	9./ -87.5	20./ -33.7
9	17./ 82.7	9./ 87.2	2./ -29.6	5./ 5.8	12./ 51.3
10	113./ 80.6	50./ 88.6	35./ 58.2	44./ -88.6	33./ -75.4
11	30./ -52.0	21./ -54.6	11./ 81.7	16./ -58.1	11./ -61.2
12	28./ -13.6	10./ -14.1	4./ -46.7	9./ -3.6	5./ 33.2
PEAK-TO-PEAK	1671.	556.	586.	802.	850.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36333. N  
 RUN NO. 4 8168. LB  
 TIME 49491.10 (SEC)

LOADED CG X= 5.04 M = 198.4 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= .71 KPA = 14.8 PSF  
 T. AIRSPEED= 73.5 KT STATIC PRES= 81.3 KPA = 1699. PSF  
 A/C MACH NO= .112 TOTAL TEMP= 286.0 DEG K = 514.8 DEG R  
 BODY ALPHA= -1.2 DEG STATIC TEMP= 285.3 DEG K = 513.5 DEG R  
 BODY BETA= 4.2 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 DENSITY ALT= 2131. M = 6993. FT  
 SONIC SPEED= 339.2 M/SEC = 1113. FPS  
 RATE OF CLIMB= -30. M/MIN = -98. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	37.69	123.6	-0.028	37.68	123.6	-0.026	ROLL	-.0	.002	.012
Y	2.78	9.1	-.002	2.78	9.1	.001	PITCH	-2.0	.004	-.008
Z	-.82	-2.7	-1.011	-.82	-2.7	-1.011	YAW	294.8	-.000	-.009

CONTROL ANGLES M.R. COLL= 9.3 DEG HORIZ FIN= 7.0 DEG  
 A1= -.2 DEG T.R. COLL= 2.3 DEG  
 B1= 2.8 DEG PEDAL POS= 2.7 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.2 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -4.1 DEG  
 TIP MAX-MACH= .78 DELTA PSI= -4.2 DEG  
 TIP MIN-MACH= .55  
 .9R MAX-MACH= .71 ENGINE POWER= 359. KW = 482. HP  
 .9R MIN-MACH= .49 THRUST FACTOR= .713E+07 N = .160E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81	MU= .166	TOTAL CQ= .000218	AMB TEMP= 12.1 C = 53.83 F		
RUN NO. 4	V= 73.5 KT	MAST CQ= .000208	TEMP U60= 32.2 C = 90.00 F		
TIME 49491.04	NZ= 1.011 G	OMEGA= 34.009 RAD/SEC	CAN TEMP= 33.1 C = 91.56 F		
CLP= .00503	RPM/324= 1.002				
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 7.8 A0= .3	A1= -.8 A1= -.3	B1= 3.0 B1= .2	PEAK-TO-PEAK= 6.3 PEAK-TO-PEAK= .6
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	45245.	-641.	-3907.	-2016.	-349.
HARMONIC-1	4549./ -13.8	1036./ -14.2	194./ -23.1	1443./ -14.2	173./ -47.9
2	267./ -69.8	65./ 6.4	45./ 10.2	348./ -19.1	23./ -13.0
3	114./ -62.4	39./ 72.3	41./ -18.6	282./ 5.5	62./ 69.8
4	242./ 38.6	204./ 12.4	70./ 24.4	81./ 65.4	27./ 31.9
5	132./ 45.2	9./ .1	22./ -4.2	82./ 5.0	16./ 87.3
6	408./ 64.1	167./ 38.9	63./ 42.4	97./ 22.2	17./ 64.8
7	92./ .5	109./ 33.3	30./ 62.1	29./ 13.2	4./ -66.2
8	15./ -43.5	50./ 59.6	19./ 46.3	50./ 21.8	5./ -61.4
9	51./ -83.8	147./ -51.3	72./ -42.9	100./ 28.2	3./ -83.1
10	60./ 5.6	46./ -15.4	26./ -25.8	49./ -54.8	7./ -21.8
11	99./ -.2	23./ 82.3	8./ 71.1	99./ -39.8	14./ -65.2
12	45./ 5.6	6./ 74.2	14./ 51.4	41./ -43.3	10./ -60.2
PEAK-TO-PEAK	10557.	2655.	742.	3593.	504.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1976.	-104.	-168.	-463.	-463.
HARMONIC-1	453./ -41.3	218./ -83.7	223./ -85.8	221./ -73.1	86./ -88.6
2	130./ -18.4	112./ -31.9	151./ -22.7	191./ -16.8	120./ -22.8
3	101./ -30.1	13./ 2.2	19./ -85.5	53./ -41.4	119./ -19.0
4	137./ 38.8	53./ 17.9	41./ 2.9	40./ 49.5	58./ 64.9
5	95./ -32.6	11./ 6.2	15./ -39.6	30./ -1.4	39./ 18.1
6	50./ 72.3	12./ -52.8	18./ 75.1	13./ 9.7	35./ -59.4
7	19./ -29.1	15./ -23.4	17./ -52.9	23./ 10.7	36./ 58.1
8	62./ -5.3	11./ 18.1	17./ 3.5	8./ -66.7	30./ -6.2
9	61./ 11.6	34./ 13.7	26./ -5.2	37./ 23.8	36./ 49.3
10	26./ 64.2	14./ 64.4	7./ -82.0	10./ -86.4	9./ -15.9
11	23./ -78.2	20./ -57.2	7./ 6.6	11./ -40.1	9./ -40.6
12	22./ -36.7	13./ -44.6	3./ -85.4	7./ -43.5	1./ -57.3
PEAK-TO-PEAK	1454.	657.	639.	821.	738.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36265. N  
 RUN NO. 5 8153. LB  
 TIME 49586.60 (SEC)

LOADED CG X= 5.04 M = 198.5 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= .87 KPA = 18.3 PSF  
 STATIC PRES= 81.3 KPA = 1698. PSF  
 T. AIRSPEED= 81.5 KT TOTAL TEMP= 286.1 DEG K = 514.9 DEG R  
 A/C MACH NO= .124 STATIC TEMP= 285.2 DEG K = 513.3 DEG R  
 BODY ALPHA= -.7 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 BODY BETA= 1.8 DEG DENSITY ALT= 2132. M = 6996. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -11. M/MIN = -37. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	41.89	137.4	-0.033	41.88	137.4	-.032	ROLL	-.1	-.006	-.032
Y	1.34	4.4	.001	1.33	4.4	-.005	PITCH	-.9	.005	-.007
Z	-.48	-1.6	-1.032	-.48	-1.6	-1.032	YAW	271.8	-.005	.010

CONTROL ANGLES M.R. COLL= 9.4 DEG HORIZ FIN= 7.1 DFG  
 A1= -.1 DEG T.R. COLL= 1.8 DEG  
 B1= 3.1 DEG PEDAL POS= 2.2 DEG

ROTOR PARAMETERS SHAFT ALPHA= -.7 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -3.8 DEG  
 TIP MAX-MACH= .79 DELTA PSI= -1.8 DEG  
 TIP MIN-MACH= .54  
 .9R MAX-MACH= .72 ENGINE POWER= 347. KW = 465. HP  
 .9R MIN-MACH= .48 THRUST FACTOR= .715E+07 N = .161E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .184	TOTAL CQ= .000210	AMB TEMP= 12.0 C = 53.65 F		
RUN NO.	V= 81.5 KT	MAST CQ= .000200	TEMP U60= 31.5 C = 88.77 F		
	NZ= 1.032 G	OMEGA= 34.054 RAD/SEC	CAN TEMP= 30.8 C = 87.39 F		
TIME	49586.45	CLP= .00512	RPM/324= 1.004		
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.9	A1= -.9	B1= 3.3	PEAK-TO-PEAK= 6.7
	TEETER ANG (DEG)	A0= .3	A1= -.5	B1= .2	PEAK-TO-PEAK= 1.0
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	45549.	-555.	-3807.	-2030.	-364.
HARMONIC-1	4479./ -10.6	1010./ -11.2	193./ -20.6	1561./ -16.4	195./ -45.9
2	248./ -40.6	79./ 49.9	30./ 22.5	519./ -10.0	36./ -12.4
3	674./ 17.2	177./ 20.7	8./ -16.5	319./ 5.4	61./ 68.2
4	224./ -76.5	186./ 86.4	83./ -87.7	83./ -23.6	34./ -88.5
5	465./ 60.4	68./ 70.7	32./ 40.7	163./ 87.4	31./ -33.1
6	1037./ 83.9	586./ 72.7	177./ 75.1	218./ 86.7	42./ -84.3
7	547./ 64.4	370./ 76.9	134./ 81.8	187./ 59.9	7./ -48.1
8	133./ -30.2	82./ -40.9	38./ -32.7	51./ 85.1	3./ 29.0
9	93./ -5.9	145./ -47.2	60./ -25.1	129./ 62.7	6./ -13.3
10	18./ 68.2	121./ -88.6	56./ 70.0	150./ -37.8	19./ -18.6
11	18./ 74.5	87./ -22.5	36./ -33.8	15./ 30.1	11./ -22.0
12	168./ -45.6	48./ -37.7	43./ -43.8	58./ 82.4	21./ 5.5
PEAK-TO-PEAK	10535.	3445.	1137.	3893.	607.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1956.	-113.	-180.	-473.	-465.
HARMONIC-1	509./ -37.8	256./ -70.5	262./ -69.9	250./ -69.8	101./ -85.5
2	139./ -8.7	110./ -25.9	146./ -14.8	180./ -15.1	98./ -23.7
3	139./ -18.7	45./ 6.2	30./ 37.9	53./ -26.0	92./ -11.5
4	203./ -74.1	62./ 85.3	23./ 43.3	67./ -73.5	77./ -52.2
5	140./ 44.2	13./ 43.3	32./ 23.3	37./ 25.3	23./ 30.0
6	25./ -30.7	8./ 39.5	18./ -1.9	8./ 3.6	54./ 31.6
7	117./ 54.8	31./ 40.9	46./ 43.0	1./ -31.5	41./ 33.4
8	39./ -83.3	6./ 38.1	9./ 60.8	14./ 33.1	19./ 61.7
9	63./ 52.4	37./ 62.7	19./ 59.1	35./ 84.9	25./ -72.0
10	99./ -70.5	38./ -98.9	29./ 85.8	46./ -53.3	38./ -54.6
11	22./ 5.2	5./ 44.6	4./ 14.0	5./ -87.6	8./ 70.0
12	60./ 14.4	24./ 11.5	13./ 1.1	20./ 20.2	15./ 22.1
PEAK-TO-PEAK	1665.	733.	771.	940.	758.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36225. N LOADED CG X= 5.04 M = 198.5 IN  
 RUN NO. 6 8144. LB Y= -.00 = -.0  
 TIME 49669.10 (SEC) Z= 1.83 = 71.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.12 KPA = 23.5 PSF  
 T. AIRSPEED= 92.4 KT STATIC PRES= 81.3 KPA = 1698. PSF  
 A/C MACH NO= .140 TOTAL TEMP= 286.3 DEG K = 515.3 DEG R  
 BODY ALPHA= -1.9 DEG STATIC TEMP= 285.2 DEG K = 513.3 DEG R  
 BODY BETA= .5 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= 7. M/MIN = 23. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	47.49	155.8	-0.035	47.49	155.8	-0.038	ROLL	-1.1	.001	.056
Y	.38	1.2	.009	.38	1.2	.021	PITCH	-1.8	.003	.014
Z	-1.61	-5.3	-1.006	-1.61	-5.3	-1.006	YAW	261.7	-.004	-.003

CONTROL ANGLES M.R. COLL= 10.0 DEG HORIZ FIN= 7.6 DEG  
 A1= .0 DEG T.R. COLL= 1.7 DEG  
 B1= 4.2 DEG PEDAL POS= 2.2 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.9 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -6.1 DEG  
 TIP MAX-MACH= .81 DELTA PSI= -.5 DEG  
 TIP MIN-MACH= .52  
 .9R MAX-MACH= .74 ENGINE POWER= 387. KW = 519. HP  
 .9R MIN-MACH= .46 THRUST FACTOR= .712E+07 N = .160E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .209	TOTAL CQ= .000236	AMB TEMP= 12.0 C = 53.63 F		
RUN NO.	V= 92.4 KT	MAST CQ= .000229	TEMP U60= 31.5 C = 88.75 F		
TIME	NZ= 1.006 G	OMEGA= 33.965 RAD/SEC	CAN TEMP= 29.2 C = 84.60 F		
CLP#	.00501	RPM/324= 1.001			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 8.5	A1= -.9	B1= 4.4	PEAK-TO-PEAK= 8.9
	TEETER ANG (DEG)	A0= .3	A1= -.8	B1= .0	PEAK-TO-PEAK= 1.6
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	44335.	-287.	-3666.	-2313.	-389.
HARMONIC-1	4361./ -12.6	904./ -17.1	186./ -24.7	1905./ -20.3	245./ -43.9
2	389./ -50.1	92./ -84.3	21./ 81.8	646./ -59.4	70./ -63.0
3	1899./ 59.3	442./ 57.7	53./ 73.8	324./ 5.3	52./ 52.3
4	257./ 12.2	165./ -9.3	75./ -3.6	106./ 35.8	15./ -2.6
5	592./ -76.9	133./ -70.2	28./ -50.3	214./ -71.5	28./ .2
6	1183./ -28.9	680./ -32.0	206./ -30.6	166./ 37.6	36./ 33.0
7	280./ -44.5	121./ -37.0	37./ -34.2	25./ -72.2	7./ 2.9
8	98./ -82.9	113./ 85.6	42./ 73.9	36./ -45.8	2./ 40.3
9	63./ -52.9	97./ -35.1	30./ -34.6	63./ -19.5	2./ .4
10	111./ 10.2	127./ 64.4	60./ 55.3	35./ -86.8	4./ 36.6
11	53./ 27.8	61./ 69.0	29./ 76.5	8./ -73.1	7./ 88.9
12	113./ -61.0	82./ -20.1	55./ -28.6	17./ 72.2	5./ -70.3
PEAK-TO-PEAK	13289.	3573.	908.	4641.	569.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1978.	-126.	-175.	-447.	-456.
HARMONIC-1	619./ -41.7	307./ -62.8	317./ -61.6	309./ -63.5	119./ -84.7
2	127./ -59.1	87./ -56.1	106./ -42.3	121./ -33.1	77./ -23.5
3	123./ 36.0	75./ 47.3	60./ 56.9	41./ -64.7	60./ -36.3
4	115./ -11.8	29./ -21.3	19./ 57.8	20./ -30.6	59./ 8.5
5	155./ -83.6	21./ 76.1	6./ 60.5	27./ 65.3	35./ -87.6
6	88./ -33.3	14./ 39.3	17./ -9.8	13./ 85.2	19./ -49.4
7	10./ 39.0	4./ -30.3	10./ 4.0	2./ 66.9	18./ 32.7
8	48./ -68.9	8./ -49.4	14./ -78.3	5./ 2.1	10./ 31.7
9	41./ -20.0	24./ -15.1	6./ 2.1	26./ -8.2	25./ -17.8
10	32./ 70.0	11./ -80.8	16./ 75.1	12./ -78.3	7./ -60.0
11	12./ -84.6	7./ 59.1	8./ 67.2	11./ 63.7	5./ 71.6
12	8./ -84.1	1./ -28.0	1./ 65.8	4./ 68.0	2./ -41.8
PEAK-TO-PEAK	1772.	770.	797.	799.	458.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36187. N LOADED CG X= 5.04 M = 198.5 IN  
 RUN NO. 7 8135. LB Y= -.00 = -.0  
 TIME 49751.10 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.34 KPA = 27.9 PSF  
 T. AIRSPEED= 100.7 KT STATIC PRES= 81.3 KPA = 1697. PSF  
 A/C MACH NO= .153 TOTAL TEMP= 286.5 DEG K = 515.6 DEG R  
 BODY ALPHA= -1.8 DEG STATIC TEMP= 285.1 DEG K = 513.2 DEG R  
 BODY BETA= -.0 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 DENSITY ALT= 2134. M = 7003. FT  
 SONIC SPEED= 339.1 M/SEC = 1112. FPS  
 RATE OF CLIMB= -2. M/MIN = -6. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	51.79	169.9	-.040	51.78	169.9	-.039	ROLL	-.8	.004	-.011
Y	-.02	-.1	.010	-.01	-.0	.008	PITCH	-1.8	.002	-.003
Z	-1.60	-5.3	-1.033	-1.60	-5.3	-1.033	YAW	303.7	-.002	.020

CONTROL ANGLES M.R. COLL= 10.3 DEG HORIZ FIN= 7.9 DEG  
 A1= .1 DEG T.R. COLL= 1.9 DEG  
 B1= 4.7 DEG PEDAL POS= 2.4 DEG

ROTOR PARAMETERS SHAFT ALPHA= -1.8 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -6.5 DEG  
 TIP MAX-MACH= .82 DELTA PSI= .0 DEG  
 TIP MIN-MACH= .51  
 .9R MAX-MACH= .75 ENGINE POWER= 410. KW = 549. HP  
 .9R MIN-MACH= .45 THRUST FACTOR= .718E+07 N = .162E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81 MU= .227 TOTAL CQ= .000248 AMB TEMP= 12.0 C = 53.53 F  
 V= 100.7 KT MAST CQ= .000236 TEMP U60= 31.2 C = 88.22 F  
 RUN NO. 7 NZ= 1.033 G OMEGA= 34.040 RAD/SEC CAN TEMP= 27.3 C = 81.11 F  
 TIME 49750.95 CLP= .00511 RPM/324= 1.003

ROTOR ANGLES THETA 3/4 (DEG) A0= 8.8 A1= -.8 B1= 4.9 PEAK-TO-PEAK= 10.1  
 TEETER ANG (DEG) A0= .3 A1= -.9 B1= .0 PEAK-TO-PEAK= 1.8

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	44362.	-143.	-3604.	-2512.	-417.
HARMONIC-1	4196./ -18.3	832./ -25.1	174./ -33.6	2053./ -24.0	280./ -41.7
2	375./ 67.7	105./ 59.3	29./ 84.0	1033./ -63.3	100./ -60.8
3	2170./ 69.7	510./ 70.4	75./ 84.0	239./ 12.6	51./ 49.7
4	605./ 54.1	283./ 45.8	101./ 35.0	198./ 83.9	29./ 45.8
5	415./ -83.5	109./ -73.4	11./ -44.2	180./ -53.0	29./ 24.3
6	1045./ 1.9	631./ -3.3	191./ -2.3	146./ 82.1	31./ 61.8
7	175./ 23.5	46./ 75.2	12./ -80.0	4./ 64.1	5./ -82.1
8	103./ -74.6	93./ 86.1	28./ 83.1	16./ 73.2	6./ -67.4
9	155./ 38.2	101./ 24.3	49./ 21.9	37./ -15.8	5./ -24.4
10	129./ 44.5	172./ -51.5	70./ -51.8	54./ 55.5	6./ -18.8
11	76./ -72.2	35./ -60.8	23./ -26.1	24./ 1.6	2./ 63.1
12	152./ -4.0	86./ 6.5	50./ 5.6	22./ 65.9	4./ -65.5
PEAK-TO-PEAK	13266.	3304.	943.	5511.	640.

BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
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MEAN	-1963.	-143.	-183.	-448.	-457.
HARMONIC-1	659./ -44.8	325./ -62.6	344./ -62.6	343./ -64.6	142./ -85.4
2	209./ -70.4	154./ -72.0	157./ -65.9	143./ -56.7	69./ -33.4
3	85./ 82.7	73./ 56.0	52./ 62.0	48./ -63.3	52./ -57.5
4	162./ 53.1	53./ 39.1	30./ 52.9	30./ 52.9	75./ 34.8
5	128./ -65.0	9./ 86.7	11./ 3.1	15./ -81.2	41./ -68.5
6	46./ -55.3	10./ 50.6	5./ 27.7	15./ 55.4	15./ -32.4
7	13./ -66.0	5./ 51.0	4./ -63.9	8./ 76.5	17./ 25.4
8	19./ -87.6	4./ -37.3	9./ 80.4	7./ 16.5	13./ 36.3
9	22./ -12.6	18./ -15.1	8./ -18.1	22./ -8.4	20./ -2.4
10	41./ 55.3	18./ 51.9	15./ 55.8	22./ 63.8	16./ 59.0
11	10./ 5.0	8./ -1.2	5./ -6.9	7./ -12.2	3./ 32.9
12	8./ -21.3	3./ -3.5	5./ -23.4	4./ -17.6	2./ 6.9
PEAK-TO-PEAK	1823.	858.	928.	938.	496.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36148. N LOADED CG X= 5.04 M = 198.5 IN  
 RUN NO. 8 8127. LB Y= -.00 = -.0  
 TIME 49846.00 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.58 KPA = 33.0 PSF  
 T. AIRSPEED= 109.4 KT STATIC PRES= 81.2 KPA = 1696. PSF  
 A/C MACH ND= .166 TOTAL TEMP= 286.6 DEG K = 515.9 DEG R  
 BODY ALPHA= -2.0 DEG STATIC TEMP= 285.1 DEG K = 513.1 DEG R  
 BODY BETA= .0 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 DENSITY ALT= 2139. M = 7019. FT  
 SONIC SPEED= 339.0 M/SEC = 1112. FPS  
 RATE OF CLIMB= -12. M/MIN = -39. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)
X	56.22	184.5	56.21	184.4	-	.8	.005	-.006
Y	.02	.1	.03	.1	-	-2.2	.006	.006
Z	-2.01	-6.6	-1.041	-2.01	-6.6	-1.041	299.3	.016

CONTROL ANGLES M.R. COLL= 10.8 DEG HORIZ FIN= 8.2 DEG  
 AI= .1 DEG T.R. COLL= 2.3 DEG  
 BI= 5.2 DEG PEDAL POS= 2.7 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.0 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -7.3 DEG  
 TIP MAX-MACH= .83 DELTA PSI= -.0 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .77 ENGINE POWER= 442. KW = 593. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .719E+07 N = .162E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .246	TOTAL CQ= .000267	AMB TEMP= 11.9 C = 53.43 F		
RUN NO.	V= 109.4 KT	MAST CQ= .000253	TEMP U60= 31.2 C = 88.12 F		
TIME	NZ= 1.041 G	OMEGA= 34.054 RAD/SEC	CAN TEMP= 25.7 C = 78.31 F		
49845.85	CLP= .00514	RPM/324= 1.004			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 9.3 A0= .3	A1= -.8 A1= -1.0	B1= 5.5 B1= -.1	PEAK-TO-PEAK= 11.2 PEAK-TO-PEAK= 1.9
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	43631.	116.	-3480.	-2732.	-451.
HARMONIC-1	4195./ -27.0	894./ -32.0	198./ -35.3	2257./ -30.2	302./ -43.9
2	208./ -79.4	34./ -58.0	20./ -12.7	1410./ -54.4	140./ -52.6
3	1881./ 63.7	483./ 62.5	72./ 65.3	236./ -10.6	64./ 36.5
4	309./ 66.3	197./ 67.5	80./ 56.0	241./ -87.3	37./ 71.8
5	58./ -22.7	12./ 11.3	17./ -64.7	101./ -18.8	13./ 3.7
6	1020./ 32.2	611./ 25.0	177./ 22.3	210./ -43.9	29./ -68.6
7	135./ 70.5	108./ -62.1	36./ -57.6	44./ -77.6	5./ 68.8
8	214./ -53.8	116./ -61.3	43./ -60.1	50./ -38.8	6./ -60.3
9	79./ -65.5	90./ 12.4	40./ 4.7	37./ -18.9	5./ .5
10	145./ 51.9	167./ -16.0	85./ -13.5	104./ 68.6	7./ -32.9
11	109./ -12.4	32./ -2.1	12./ -54.2	13./ 3.9	3./ -30.9
12	75./ 13.1	79./ 11.4	52./ 8.4	6./ -29.4	3./ -86.1
PEAK-TO-PEAK	14352.	3732.	953.	6370.	838.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1929.	-147.	-192.	-449.	-459.
HARMONIC-1	757./ -50.5	372./ -64.6	373./ -66.7	368./ -68.6	163./ 89.9
2	300./ -55.6	221./ -71.7	241./ -68.7	207./ -65.3	87./ -44.7
3	56./ 16.4	35./ 51.3	45./ 76.9	58./ -84.2	54./ -87.7
4	188./ 80.5	66./ 67.2	46./ 58.5	57./ 82.9	98./ 58.4
5	53./ -4.3	4./ -87.3	18./ 82.4	8./ 16.0	36./ 72.7
6	33./ 11.1	11./ 48.2	16./ 48.6	7./ 17.6	29./ -72.1
7	26./ -53.2	13./ -31.5	24./ -77.1	6./ 6.2	31./ -36.9
8	10./ 22.9	4./ -84.9	7./ -14.7	9./ -37.9	15./ -12.1
9	21./ -50.6	13./ -54.6	8./ -50.1	20./ -35.5	17./ -25.3
10	46./ 44.2	23./ 41.5	16./ 38.5	31./ 45.8	23./ 50.1
11	8./ 78.7	4./ -10.6	4./ -88.0	4./ 57.8	3./ -60.9
12	11./ -75.7	5./ -55.8	4./ -73.2	3./ -18.2	2./ -44.4
PEAK-TO-PEAK	2117.	1038.	1112.	1130.	613.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36154. N LOADED CG X= 5.04 M = 198.5 IN  
 RUN NO. 8 8128. LB Y= -.00 = -.0  
 TIME 49847.10 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.58 KPA = 32.9 PSF  
 T. AIRSPEED= 109.3 KT STATIC PRES= 81.2 KPA = 1697. PSF  
 A/C MACH NO= .166 TOTAL TEMP= 286.6 DEG K = 515.9 DEG R  
 BODY ALPHA= -2.1 DEG STATIC TEMP= 285.1 DEG K = 513.1 DEG R  
 BODY BETA= -.1 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 SONIC SPEED= 339.0 M/SEC = 1112. FPS  
 RATE OF CLIMB= -3. M/MIN = -9. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)
X	56.19	184.3	56.18	184.3	ROLL	-.7	.005	.009
Y	-.10	-.3	-.09	-.3	PITCH	-2.2	.003	.005
Z	-2.10	-6.9	-1.030	-2.10	YAW	299.3	-.007	.019

CONTROL ANGLES M.R. COLL= 10.7 DEG HORIZ FIN= 8.3 DEG  
 A1= .2 DEG T.R. COLL= 2.3 DEG  
 B1= 5.3 DEG PEDAL POS= 2.7 DEG

ROTOR PARAMETERS SHAFT ALPHA= -2.1 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -7.4 DEG  
 TIP MAX-MACH= .83 DELTA PSI= .1 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .77 ENGINE POWER= 435. KW = 584. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .719E+07 N = .162E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .246	TOTAL CQ= .000263	AMB TEMP= 11.9 C = 53.45 F		
RUN NO.	V= 109.3 KT	MAST CQ= .000251	TEMP U60= 31.2 C = 88.12 F		
TIME	NZ= 1.030 G	OMEGA= 34.020 RAD/SEC	CAN TEMP= 25.7 C = 78.31 F		
	CLP= .00510	RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG)	AO= 9.3	A1= -.8	B1= 5.6	PEAK-TO-PEAK= 11.2
	TEETER ANG (DEG)	AO= .3	A1= -1.1	B1= -.1	PEAK-TO-PEAK= 2.0
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	43661.	90.	-3483.	-2746.	-449.
HARMONIC-1	4251./ -28.4	914./ -33.7	202./ -37.6	2245./ -29.6	305./ -43.6
2	352./ 77.0	67./ 71.6	16./ -39.6	1440./ -52.3	143./ -51.0
3	1871./ 60.0	469./ 58.3	73./ 58.3	240./ -9.2	69./ 38.6
4	276./ 58.1	178./ 63.1	77./ 52.6	233./ -89.2	37./ 72.7
5	48./ 78.6	21./ -87.0	9./ -59.8	140./ -15.3	19./ -2.1
6	962./ 31.4	558./ 25.5	169./ 23.5	181./ -41.8	28./ -65.2
7	50./ -86.1	123./ -46.2	37./ -36.0	52./ 82.1	3./ 66.7
8	187./ -60.7	125./ -56.2	46./ -52.2	65./ -36.5	7./ -42.8
9	89./ -54.9	103./ 1.8	50./ -5.1	22./ -.9	5./ 13.7
10	108./ 60.8	88./ -12.6	50./ -7.6	88./ 70.8	4./ -10.1
11	97./ -20.8	26./ -25.2	7./ -44.4	12./ -8.3	6./ -11.1
12	100./ 9.6	59./ .4	41./ 8.1	5./ -16.5	5./ -57.7
PEAK-TO-PEAK	14352.	3695.	953.	6380.	855.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1945.	-150.	-191.	-450.	-457.
HARMONIC-1	750./ -51.9	373./ -64.7	374./ -66.7	368./ -69.3	163./ 89.6
2	309./ -55.9	224./ -70.6	243./ -68.0	208./ -64.3	86./ -43.6
3	58./ 23.6	34./ 48.0	41./ 73.6	55./ -86.2	53./ -89.9
4	184./ 77.5	64./ 64.4	46./ 53.3	55./ 81.1	93./ 55.7
5	61./ -7.3	2./ 51.4	19./ 72.0	8./ 19.0	32./ 66.4
6	32./ 7.4	11./ 44.5	15./ 47.6	9./ 21.8	25./ -60.5
7	21./ -40.6	15./ -47.4	21./ -78.3	9./ 20.0	30./ -27.3
8	11./ -23.9	1./ 47.7	4./ -12.7	10./ -31.9	17./ -10.5
9	14./ -31.8	12./ -52.6	6./ -22.8	19./ -33.4	17./ -21.1
10	45./ 53.6	22./ 49.2	15./ 39.5	29./ 48.8	21./ 56.8
11	7./ 53.6	1./ 18.0	2./ 87.2	4./ 45.1	3./ -64.2
12	17./ -77.3	7./ -65.8	9./ -75.1	2./ -56.3	2./ -64.4
PEAK-TO-PEAK	2116.	1064.	1112.	1116.	619.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36082. N  
 RUN NO. 9 8112. LB LOADED CG X= 5.04 M = 198.6 IN  
 TIME 49942.10 (SEC) Y= -.00 Z= -.0  
 Z= 1.83 M 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.88 KPA = 39.2 PSF  
 T. AIRSPEED= 119.2 KT STATIC PRES= 81.2 KPA = 1697. PSF  
 A/C MACH NO= .181 TOTAL TEMP= 287.1 DEG K = 516.7 DEG R  
 BODY ALPHA= -2.2 DEG STATIC TEMP= 285.2 DEG K = 513.4 DEG R  
 BODY BETA= .7 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -26. M/MIN = -86. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATEFS (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	61.29	201.1	-0.057	61.27	201.0	-0.061	ROLL	-.3	-.003	.028
Y	.80	2.6	.002	.79	2.6	.008	PITCH	-2.6	.010	.018
Z	-2.32	-7.6	-1.064	-2.32	-7.6	-1.063	YAW	295.6	-.002	-.006

CONTROL ANGLES M.R. COLL= 11.3 DEG HORIZ FIN= 8.6 DEG  
 A1= .3 DEG T.R. COLL= 2.7 DEG  
 B1= 5.8 DEG PEDAL POS= 3.1 DEG

ROTOR PARAMETERS HOVER TIP MACH= .67 SHAFT ALPHA= -2.2 DEG  
 CONTROL ALPHA= -7.9 DEG  
 TIP MAX-MACH= .85 DELTA PSI= -.7 DEG  
 TIP MIN-MACH= .49  
 .9R MAX-MACH= .78 ENGINE POWER= 472. KW = 633. HP  
 .9R MIN-MACH= .42 THRUST FACTOR= .724E+07 N = .163E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81 MU= .268 TOTAL CQ= .000284 AMB TEMP= 12.1 C = 53.71 F  
 V= 119.2 KT MAST CQ= .000266 TEMP U60= 31.2 C = 88.12 F  
 RUN NO. 9 NZ= 1.063 G .OMEGA= 34.084 RAD/SEC CAN TEMP= 24.6 C = 76.21 F  
 TIME 49942.03 CLP= .00524 RPM/324= 1.005

ROTOR ANGLES THETA 3/4 (DEG) AO= 9.7 A1= -.5 B1= 6.2 PEAK-TO-PEAK= 12.2  
 TEETER ANG (DEG) AO= .3 A1= -1.1 B1= -.1 PEAK-TO-PEAK= 2.1

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	43386.	279.	-3403.	-2955.	-484.
HARMONIC-1	4403./ -38.3	940./ -41.2	227./ -40.5	2510./ -36.9	329./ -46.3
2	408./ -64.5	93./ -27.5	32./ -2.7	1799./ -52.2	177./ -54.5
3	2040./ 38.8	527./ 39.0	88./ 50.5	261./ -39.7	67./ 22.3
4	428./ 15.9	205./ 11.0	83./ 5.9	242./ 63.2	35./ 33.3
5	228./ -73.8	76./ -54.9	35./ -66.8	148./ -6.3	32./ -1.1
6	859./ 7.8	500./ 4.4	156./ 1.4	164./ -26.1	21./ -41.8
7	95./ 58.4	81./ 27.6	31./ 27.2	22./ 36.6	2./ 82.1
8	250./ -89.3	140./ -54.7	62./ -58.3	60./ -38.1	5./ -60.3
9	82./ -8.9	29./ 28.4	7./ 25.0	70./ 76.1	1./ -35.1
10	117./ 17.1	79./ -63.2	52./ -87.4	93./ 15.8	9./ -13.9
11	33./ 81.1	75./ 61.4	34./ 44.7	20./ 83.6	5./ 29.7
12	35./ -5.7	18./ -10.8	13./ -35.2	12./ -24.8	3./ 78.9
PEAK-TO-PEAK	14650.	4087.	1071.	7749.	898.

BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
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MEAN	-1891.	-147.	-187.	-457.	-463.
HARMONIC-1	887./ -57.0	441./ -65.9	433./ -68.2	396./ -73.9	184./ 84.8
2	391./ -54.7	261./ -78.7	280./ -76.8	267./ -70.3	118./ -54.0
3	132./ 53.0	33./ -32.2	39./ 45.0	98./ 80.3	94./ 70.7
4	187./ 40.7	65./ 21.3	37./ 8.8	52./ 39.8	106./ 30.9
5	44./ -37.5	1./ -8.5	19./ 76.5	6./ 53.6	64./ 57.4
6	8./ -86.7	3./ -53.3	12./ -78.7	12./ -79.2	46./ -77.9
7	18./ -36.9	11./ -34.6	15./ -73.0	7./ 80.2	35./ -67.3
8	34./ 27.7	13./ 53.0	15./ -7.7	10./ -83.6	19./ -37.0
9	41./ 65.2	26./ 84.6	13./ 50.1	29./ -80.9	24./ -61.2
10	54./ -9.3	29./ -10.3	14./ -22.6	32./ 1.6	27./ 6.7
11	2./ -5.5	4./ 38.0	5./ 6.3	1./ -43.9	2./ 54.8
12	4./ -24.8	4./ -64.5	3./ 40.9	3./ 69.8	3./ -46.5
PEAK-TO-PEAK	2662.	1304.	1296.	1254.	789.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 36003. N LOADED CG X= 5.05 M = 198.6 IN  
 RUN NO. 10 8094. LB Y= -.00 = -.0  
 TIME 50060.10 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 2.29 KPA = 47.8 PSF  
 STATIC PRES= 81.4 KPA = 1699. PSF  
 T. AIRSPEED= 131.4 KT TOTAL TEMP= 287.5 DEG K = 517.4 DEG R  
 A/C MACH NO= .199 STATIC TEMP= 285.2 DEG K = 513.3 DFG R  
 BODY ALPHA= -3.4 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 BODY BETA= .0 DEG DENSITY ALT= 2124. M = 6969. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= 6. M/MIN = 18. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	67.48	221.4	-.068	67.47	221.3	-.066	ROLL	-.4	.002	.004
Y	.02	.1	.009	.03	.1	.010	PITCH	-3.3	.008	-.011
Z	-3.95	-13.0	-1.035	-3.95	-13.0	-1.035	YAW	55.4	-.003	-.004

CONTROL ANGLES M.R. COLL= 12.3 DEG HORIZ FIN= 9.3 DEG  
 A1= .3 DEG T.R. COLL= 2.8 DEG  
 B1= 6.8 DEG PEDAL POS= 3.3 DEG

ROTOR PARAMETERS SHAFT ALPHA= -3.4 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -10.1 DEG  
 TIP MAX-MACH= .87 DELTA PSI= -.0 DEG  
 TIP MIN-MACH= .47  
 .9R MAX-MACH= .80 ENGINE POWER= 555. KW = 744. HP  
 .9R MIN-MACH= .40 THRUST FACTOR= .726E+07 N = .163E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81 MU= .296 TOTAL CQ= .000333 AMB TEMP= 12.0 C = 53.66 F  
 RUN NO. 10 V= 131.4 KT MAST CQ= .000313 TEMP U60= 31.5 C = 88.75 F  
 TIME 50060.01 NZ= 1.035 G OMEGA= 34.074 RAD/SEC CAN TEMP= 23.4 C = 74.12 F  
 CLP= .00508 RPM/324= 1.004

ROTOR ANGLES THETA 3/4 (DEG) AO= 10.7 A1= -.7 B1= 7.2 PEAK-TO-PEAK= 14.1  
 TEETER ANG (DEG) AO= .3 A1= -1.4 B1= -.4 PEAK-TO-PEAK= 2.8

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DFG) (N-M/DEG)

MEAN	41521.	668.	-3284.	-3469.	-542.
HARMONIC-1	5030./ -45.3	1062./ -53.6	248./ -49.4	2953./ -39.0	379./ -45.4
2	568./ -57.3	173./ -37.4	31./ -27.9	2106./ -53.7	215./ -59.8
3	3174./ 38.2	786./ 38.9	136./ 52.5	312./ -46.1	90./ 15.4
4	703./ 7.7	350./ -5.2	144./ -11.1	348./ 61.3	49./ 9.7
5	199./ 19.4	79./ -75.4	42./ 81.6	254./ -22.4	50./ -.6
6	738./ -43.8	432./ -44.6	126./ -43.9	125./ -65.2	12./ 77.3
7	106./ 39.3	61./ 67.6	19./ 88.8	44./ 77.9	7./ 81.3
8	186./ -1.7	97./ -23.2	32./ -27.3	81./ -38.2	8./ -73.8
9	23./ 54.3	6./ -24.5	4./ -42.8	38./ -88.5	4./ -70.8
10	44./ 26.3	36./ -65.1	22./ -44.6	73./ 6.1	5./ 41.3
11	18./ 48.0	19./ 85.8	14./ -55.0	34./ -89.6	1./ 13.9
12	90./ -37.9	49./ -75.5	21./ -89.0	13./ -45.5	0./ 50.0
PEAK-TO-PEAK	16525.	4199.	961.	8991.	1044.

BEAM .174	BEAM .350	BEAM .449	BEAM .606	BEAM .803
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN	-1820.	-136.	-167.	-427.	-458.
HARMONIC-1	1117./ -61.5	513./ -65.3	501./ -65.6	457./ -70.6	202./ 82.5
2	464./ -54.6	302./ -84.5	311./ -86.2	282./ -78.3	149./ -51.5
3	215./ 31.7	21./ -14.1	62./ 52.3	144./ 70.7	149./ 72.4
4	283./ 31.7	96./ 6.0	53./ -11.3	73./ 26.0	138./ 9.1
5	114./ -53.7	7./ 55.3	19./ 14.0	16./ -57.0	62./ 33.7
6	32./ -43.0	1./ -25.3	4./ 86.8	4./ 69.6	34./ -82.4
7	40./ -83.1	14./ -89.6	23./ 78.3	9./ -51.7	45./ -71.0
8	27./ -43.1	7./ 34.0	16./ -69.3	12./ -88.6	29./ -59.5
9	14./ 49.5	15./ -74.8	6./ 28.9	22./ -64.2	27./ -53.1
10	32./ -23.2	17./ -15.3	11./ -35.7	21./ -11.3	19./ -13.1
11	7./ 17.4	5./ -62.5	3./ -16.2	4./ -47.6	1./ 41.5
12	21./ 75.8	8./ -84.2	8./ 65.5	7./ -75.4	2./ 42.7
PEAK-TO-PEAK	3333.	1525.	1473.	1393.	917.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 35932. N LOADED CG X\* 5.05 M = 198.7 IN  
 RUN NO. 11 8078. LB Y\* -.00 = -.0  
 TIME 50129.60 (SEC) Z\* 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 2.58 KPA = 53.9 PSF  
 STATIC PRES= 81.3 KPA = 1699. PSF  
 T. AIRSPEED= 139.5 KT TOTAL TEMP= 287.7 DEG K = 517.9 DEG R  
 A/C MACH NO= .212 STATIC TEMP= 285.2 DEG K = 513.3 DEG R  
 BODY ALPHA= -4.0 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 BODY BETA= -.0 DEG DENSITY ALT= 2127. M = 6980. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -14. M/MIN = -47. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	71.56	234.8	-0.077	71.56	234.8	-0.078	ROLL	-1.8	.007	.012
Y	-.01	-.0	.012	.01	-.0	.015	PITCH	-4.2	.001	.001
Z	-5.03	-16.5	-1.017	-5.03	-16.5	-1.017	YAW	59.0	-.002	-.017

CONTROL ANGLES M.R. COLL= 13.1 DEG HORIZ FIN= 9.7 DEG  
 A1= .2 DEG T.R. COLL= 3.1 DEG  
 B1= 7.3 DEG PEDAL POS= 3.6 DEG

ROTOR PARAMETERS SHAFT ALPHA= -4.0 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -11.3 DEG  
 TIP MAX-MACH= .88 DELTA PSI= -.0 DEG  
 TIP MIN-MACH= .46  
 .9R MAX-MACH= .82 ENGINE POWER= 604. KW = 810. HP  
 .9R MIN-MACH= .39 THRUST FACTOR= .725E+07 N = .163E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .314	TOTAL CQ= .000364	AMB TEMP= 12.0 C = 53.64 F		
RUN NO.	V= 139.5 KT	MAST CQ= .000340	TEMP U60= 31.5 C = 88.75 F		
TIME	NZ= 1.017 G	OMEGA= 34.020 RAD/SEC	CAN TEMP= 23.0 C = 73.42 F		
	CLP= .00500	RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 11.3	A1= -.8	B1= 7.9	PEAK-TO-PEAK= 15.8
	TEETER ANG (DEG)	A0= .3	A1= -1.5	B1= -.6	PEAK-TO-PEAK= 3.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	40335.	869.	-3220.	-3774.	-575.
HARMONIC-1	5656./ -51.5	1203./ -60.9	260./ -56.5	3299./ -40.8	415./ -46.6
2	688./ -44.7	278./ -25.7	56./ -22.4	2385./ -55.5	255./ -64.5
3	3696./ 43.0	903./ 42.8	169./ 53.7	319./ -67.3	93./ 5.1
4	603./ 16.6	355./ 1.8	151./ -8.3	418./ 59.9	64./ 13.8
5	211./ 78.4	123./ -60.7	50./ -83.5	249./ -17.4	51./ 4.1
6	621./ -48.5	344./ -46.2	116./ -48.2	137./ -34.0	11./ -41.5
7	165./ 20.2	56./ 53.8	19./ 72.1	41./ 81.4	6./ 76.1
8	129./ -16.9	86./ 2.4	34./ -9.5	72./ -41.7	7./ -77.3
9	80./ 2.0	27./ 87.0	6./ -71.7	45./ -2.7	3./ -1.0
10	18./ -64.0	43./ -63.5	32./ -44.3	41./ -25.4	1./ 12.3
11	43./ 9.4	37./ -39.3	18./ -53.1	14./ 68.7	1./ -68.3
12	84./ -32.9	37./ 47.2	9./ 89.2	8./ 38.2	2./ -7.6
PEAK-TO-PEAK	19272.	4571.	990.	10112.	1159.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1796.	-132.	-158.	-407.	-439.
HARMONIC-1	1298./ -64.0	562./ -66.1	538./ -65.5	493./ -69.3	218./ 83.6
2	529./ -56.3	337./ -88.2	342./ 88.5	294./ -85.2	150./ -52.3
3	295./ 21.7	10./ -88.4	79./ 59.4	178./ 62.7	178./ 62.6
4	338./ 34.2	105./ 6.6	55./ -17.6	80./ 24.1	148./ 3.7
5	120./ -51.1	8./ 52.2	25./ 6.7	13./ -52.9	70./ 16.3
6	16./ -78.3	8./ 15.9	8./ -32.1	8./ 62.1	27./ -79.3
7	37./ -79.7	15./ 74.7	23./ 82.2	10./ -60.8	44./ -80.7
8	32./ -80.9	7./ 10.0	20./ 86.7	12./ 79.6	30./ -76.8
9	15./ -7.4	10./ 60.8	9./ -39.5	14./ 71.7	18./ -84.5
10	23./ -53.7	12./ -66.7	5./ 89.9	16./ -55.2	16./ -48.0
11	9./ -89.9	3./ 52.1	4./ 31.1	3./ 63.8	4./ 71.7
12	11./ 46.4	5./ 71.1	6./ -51.4	3./ -31.4	2./ 31.3
PEAK-TO-PEAK	3879.	1697.	1532.	1512.	1041.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 35894. N LOADED CG X= 5.05 M = 198.7 IN  
 RUN NO. 12 8070. LB Y= -.00 = -.0  
 TIME 50237.10 (SEC) Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.08 KPA = 64.3 PSF  
 T. AIRSPEED= 152.1 KT STATIC PRES= 81.3 KPA = 1698. PSF  
 A/C MACH NO= .231 TOTAL TEMP= 288.0 DEG K = 518.5 DEG R  
 BODY ALPHA= -5.3 DEG STATIC TEMP= 285.0 DEG K = 513.0 DEG R  
 BODY BETA= .1 DEG DENSITY= .99 KG/M3 = .00193 SLUG/FT3  
 DENSITY ALT= 2126. M = 6975. FT  
 SONIC SPEED= 339.0 M/SEC = 1112. FPS  
 RATE OF CLIMB= -1. M/MIN = -5. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	77.93	255.7	-0.094	77.92	255.6	-.097	ROLL	-.3	.000	-.020
Y	.08	.3	.012	.08	.3	.008	PITCH	-.5.3	.007	.011
Z	-7.17	-23.5	-1.028	-7.17	-23.5	-1.028	YAW	64.1	-.002	.018

CONTROL ANGLES M.R. COLL= 15.0 DEG HORIZ FIN= 10.5 DEG  
 A1= .0 DEG T.R. COLL= 3.8 DEG  
 B1= 8.2 DEG PEDAL POS= 4.3 DEG

ROTOR PARAMETERS SHAFT ALPHA= -5.3 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -13.5 DEG  
 TIP MAX-MACH= .90 DELTA PSI= -.1 DEG  
 TIP MIN-MACH= .44  
 .9R MAX-MACH= .84 ENGINE POWER= 729. KW = 978. HP  
 .9R MIN-MACH= .37 THRUST FACTOR= .727E+07 N = .163E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81	MU= .343	TOTAL CO= .000439	AMB TEMP= 11.8 C = 53.32 F		
RUN NO. 12	V= 152.1 KT	MAST CO= .000410	TEMP U60= 31.9 C = 89.35 F		
TIME 50236.95	NZ= 1.028 G	OMEGA= 34.021 RAD/SEC	CAN TEMP= 22.6 C = 72.72 F		
CLP= .00505		RPM/324= 1.003			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 12.9	A1= -1.0	B1= 9.2	PEAK-TO-PEAK= 18.2
	TEETER ANG (DEG)	A0= .3	A1= -1.6	B1= -.8	PEAK-TO-PEAK= 3.5
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	37704.	1363.	-3142.	-4481.	-663.
HARMONIC-1	7396./ -60.6	1679./ -66.4	344./ -64.2	4040./ -43.6	492./ -46.8
2	1098./ -51.5	399./ -29.8	108./ -25.1	3028./ -52.3	311./ -66.2
3	5086./ 46.5	1222./ 46.3	241./ 53.0	490./ 76.9	103./ -2.9
4	894./ -6.8	491./ -5.4	178./ -16.0	509./ 66.2	67./ 6.2
5	406./ 84.9	192./ -70.3	71./ -76.3	262./ .5	52./ 19.7
6	728./ -62.7	377./ -63.6	123./ -61.3	232./ -.2	26./ 14.3
7	67./ -18.0	69./ -56.8	25./ -29.7	15./ 43.1	7./ -61.3
8	112./ 33.8	126./ 9.6	43./ 8.7	48./ -11.3	4./ -41.0
9	94./ -15.0	26./ 80.4	18./ -81.7	32./ -15.9	4./ 21.9
10	111./ 8.6	66./ -75.0	45./ -70.2	52./ 78.8	3./ -14.4
11	42./ 68.9	80./ -17.7	42./ -28.6	14./ 3.7	5./ 79.3
12	69./ -14.1	22./ -46.7	18./ -35.5	10./ -9.2	2./ -8.3
PEAK-TO-PEAK	25320.	5924.	1346.	12605.	1358.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1588.	-114.	-143.	-386.	-425.
HARMONIC-1	1732./ -67.8	656./ -67.9	607./ -66.4	560./ -69.4	259./ 85.9
2	694./ -51.4	402./ -88.3	399./ 86.6	327./ -89.9	147./ -55.5
3	503./ 20.2	37./ -42.8	103./ 60.8	242./ 51.4	257./ 47.0
4	342./ 40.8	105./ 6.0	54./ -22.1	71./ 29.0	125./ .6
5	99./ -41.6	9./ 13.1	30./ -7.1	8./ -20.0	75./ -2.9
6	37./ -8.6	14./ 10.5	19./ -35.1	14./ 83.3	23./ -58.5
7	12./ -69.0	7./ 27.7	14./ 78.4	13./ -57.9	28./ -87.7
8	23./ 87.3	5./ -46.4	15./ 64.6	7./ 79.6	21./ -89.4
9	10./ -21.5	5./ 20.2	10./ -52.8	10./ 63.4	12./ -82.4
10	38./ 66.6	21./ 77.7	12./ 52.2	25./ 84.9	20./ -83.8
11	27./ -86.5	4./ -87.1	9./ 72.0	9./ -73.9	6./ -61.5
12	12./ 58.3	3./ 65.8	3./ 74.3	4./ 73.1	1./ -66.3
PEAK-TO-PEAK	5222.	1910.	1783.	1750.	1305.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 35786. N  
 RUN NO. 13 8045. LB  
 TIME 50398.90 (SEC) LOADED CG X= 5.05 M = 198.7 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.0

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.49 KPA = 72.9 PSF  
 T. AIRSPD= 161.8 KT STATIC PRES= 81.5 KPA = 1701. PSF  
 A/C MACH NO= .246 TOTAL TEMP= 288.7 DEG K = 519.7 DEG R  
 BODY ALPHA= -5.5 DEG STATIC TEMP= 285.2 DEG K = 513.4 DEG R  
 BODY BETA= -.8 DEG DENSITY= 1.00 KG/M3 = .00193 SLUG/FT3  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -20. M/MIN = -67. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC <sup>2</sup> )
X	82.82	271.7	-.116	82.80	ROLL	-2.0	-.001	.023
Y	-1.20	-3.9	.024	-1.20	PITCH	-5.7	.011	-.010
Z	-7.99	-26.2	-1.085	-7.99	YAW	168.7	-.000	-.022

CONTROL ANGLES M.R. COLL= 16.6 DEG HORIZ FIN= 11.2 DEG  
 A1= -.3 DEG T.R. COLL= 4.4 DEG  
 B1= 8.9 DEG PEDAL POS= 4.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= -5.5 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -14.4 DEG  
 TIP MAX-MACH= .91 DELTA PSI= .8 DEG  
 TIP MIN-MACH= .42  
 .9R MAX-MACH= .84 ENGINE POWER= 814. KW = 1092. HP  
 .9R MIN-MACH= .35 THRUST FACTOR= .707E+07 N = .159E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .371	TOTAL CQ= .000512	AMB TEMP= 12.1 C = 53.78 F		
RUN NO.	V= 161.8 KT	MAST CQ= .000481	TEMP U60= 31.9 C = 89.44 F		
TIME	NZ= 1.085 G	OMEGA= 33.484 RAD/SEC	CAN TEMP= 21.8 C = 71.32 F		
	CLP= .00547	RPM/324= .987			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	AO= 14.4 AO= .3	A1= -1.6 A1= -1.1	B1= 10.3 B1= -.9	PEAK-TO-PEAK= 20.4 PEAK-TO-PEAK= 2.5
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DFG)	TORSION .449 (N-M/DEG)
MEAN	33970.	1847.	-2955.	-4751.	-715.
HARMONIC-1	10250./ -59.7	2417./ -64.4	450./ -59.3	4688./ -42.8	531./ -41.5
2	1566./ -35.1	570./ -15.8	109./ -10.4	3209./ -45.1	318./ -65.6
3	7592./ 54.6	1862./ 54.1	386./ 56.5	725./ 80.4	131./ -7.4
4	971./ -20.1	573./ -11.4	221./ -16.6	556./ 73.4	77./ 10.3
5	282./ 76.6	180./ -56.5	62./ -66.8	324./ 11.6	73./ 32.7
6	869./ -62.7	437./ -64.2	132./ -64.2	215./ 31.4	32./ 57.9
7	231./ -74.8	182./ -82.2	64./ -75.3	87./ 39.3	9./ -75.2
8	252./ 54.9	196./ 35.4	74./ 34.5	41./ -49.4	12./ -34.2
9	140./ 1.1	112./ -32.1	50./ -25.8	23./ -78.3	6./ -2.9
10	112./ -13.1	52./ 49.9	35./ 72.4	21./ 13.7	4./ -21.5
11	53./ -46.4	115./ .3	57./ -12.2	21./ -79.0	4./ -51.2
12	67./ -29.8	42./ -45.5	20./ -53.9	43./ -88.9	6./ -47.5
PEAK-TO-PEAK	35692.	9078.	2018.	14343.	1454.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DFG)	BEAM .803 (N-M/DEG)
MEAN	-1257.	-77.	-130.	-379.	-421.
HARMONIC-1	2260./ -66.9	773./ -66.7	687./ -65.5	629./ -68.4	324./ 85.8
2	770./ -37.8	450./ -82.1	447./ -88.9	371./ -84.7	188./ -43.2
3	693./ 31.6	46./ -43.7	152./ 61.6	332./ 52.4	341./ 49.8
4	334./ 52.4	111./ 10.3	64./ -23.3	69./ 39.8	116./ -.3
5	109./ -33.5	10./ 6.0	37./ -7.3	8./ -23.1	85./ -1.1
6	38./ 8.4	18./ 39.0	13./ -21.2	19./ 83.1	8./ -64.5
7	15./ 19.2	10./ -25.8	6./ 59.8	15./ -49.6	27./ -82.0
8	39./ 65.2	2./ -16.1	15./ 54.0	10./ -70.4	25./ -82.3
9	13./ -76.6	7./ 49.3	9./ -66.4	10./ 81.0	16./ -58.9
10	15./ 79.3	14./ 75.1	10./ 55.0	18./ 82.2	14./ -70.6
11	9./ -21.0	1./ -75.8	9./ 69.1	3./ -68.3	3./ -.6
12	13./ 68.3	2./ -75.7	1./ 40.8	4./ -61.2	3./ -59.5
PEAK-TO-PEAK	6688.	2242.	2008.	2027.	1548.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 081 AIRCRAFT TOTAL WT = 35784. N  
 RUN NO. 13 8045. LB  
 TIME 50399.90 (SEC)

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 3.48 KPA = 72.7 PSF  
 STATIC PRES= 81.5 KPA = 1702. PSF  
 T. AIRSPEED= 161.5 KT TOTAL TEMP= 288.7 DEG K = 519.6 DEG R  
 A/C MACH NO= .245 STATIC TEMP= 285.2 DEG K = 513.4 DEG R  
 BODY ALPHA= -5.4 DEG DENSITY= 1.00 KG/M3 = .00193 SLUG/FT3  
 BODY BETA= -1.0 DEG DENSITY ALT= 2113. M = 6932. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= 12. M/MIN = 40. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	82.71	271.4	-113	82.70	271.3	-112	ROLL	-2.1	.001	.022
Y	-1.42	-4.7	.041	-1.42	-4.7	.045	PITCH	-5.3	.003	-.008
Z	-7.89	-25.9	-1.061	-7.89	-25.9	-1.061	YAW	167.9	.001	.031

CONTROL ANGLES M.R. COLL= 16.6 DEG HORIZ FIN= 11.4 DEG  
 A1= -.3 DEG T.R. COLL= 4.4 DEG  
 B1= 9.2 DEG PEDAL POS= 4.9 DEG

ROTOR PARAMETERS SHAFT ALPHA= -5.4 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -14.6 DEG  
 TIP MAX-MACH= .91 DELTA PSI= 1.0 DEG  
 TIP MIN-MACH= .42  
 .9R MAX-MACH= .84 ENGINE POWER= 819. KW = 1099. HP  
 .9R MIN-MACH= .35 THRUST FACTOR= .706E+07 N = .159E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 81	MU= .371	TOTAL CQ= .000517	AMB TEMP= 12.1 C = 53.75 F		
RUN NO. 13	V= 161.5 KT	MAST CQ= .000490	TEMP U60= 31.9 C = 89.38 F		
TIME 50399.78	NZ= 1.061 G	OMEGA= 33.446 RAD/SEC	CAN TEMP= 21.8 C = 71.32 F		
CLP= .00537	RPM/324= .986				
ROTOR ANGLES	THETA 3/4 (DEG)	AO= 14.4	A1= -1.6	B1= 10.6	PEAK-TO-PEAK= 21.4
	TEETER ANG (DEG)	AO= .3	A1= -1.3	B1= -1.0	PEAK-TO-PEAK= 3.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	33605.	1895.	-2940.	-4766.	-708.
HARMONIC-1	10108./ -61.7	2392./ -66.7	445./ -62.2	4735./ -42.8	541./ -41.4
2	1265./ -33.1	528./ -11.3	107./ -4.5	3215./ -43.9	322./ -62.9
3	7406./ 55.4	1785./ 54.5	369./ 56.7	737./ 77.3	129./ -7.5
4	1027./ -15.2	568./ -11.8	220./ -17.4	578./ 79.1	71./ 7.1
5	247./ 80.7	158./ -54.3	47./ -66.9	307./ 8.1	61./ 30.3
6	859./ -60.9	431./ -64.5	133./ -62.2	254./ 29.4	36./ 44.8
7	298./ -70.5	193./ -64.8	58./ -55.9	67./ 6.4	8./ -60.9
8	203./ 42.0	172./ 37.7	61./ 34.7	34./ -58.0	10./ -43.9
9	165./ -6.1	116./ -15.1	56./ -19.4	27./ -17.9	6./ 20.2
10	103./ 2.5	64./ 83.2	40./ 88.6	51./ 77.4	5./ 56.3
11	75./ -50.7	136./ -3.1	72./ -3.8	9./ 87.7	4./ 83.8
12	17./ -69.4	45./ -70.3	21./ -81.3	29./ 68.9	7./ -52.4
PEAK-TO-PEAK	34653.	8683.	1860.	14452.	1465.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1252.	-74.	-127.	-373.	-412.
HARMONIC-1	2287./ -67.9	772./ -67.0	682./ -65.4	625./ -68.3	313./ 86.3
2	755./ -36.7	445./ -81.1	443./ -87.7	366./ -83.5	186./ -43.0
3	691./ 31.0	53./ -42.9	148./ 63.1	327./ 52.6	337./ 49.2
4	324./ 59.8	101./ 16.3	61./ -23.4	67./ 51.5	97./ 7.0
5	89./ -31.1	10./ -21.9	34./ -9.5	6./ -8.9	82./ -4.5
6	54./ 4.1	21./ 43.7	18./ -11.7	16./ 85.8	11./ -26.3
7	26./ -4.2	9./ -4.3	9./ 8.9	9./ -50.4	21./ 63.0
8	38./ 61.1	6./ 34.5	14./ 43.8	4./ -56.0	17./ 85.3
9	21./ -69.7	8./ 11.2	11./ -53.9	7./ 39.2	8./ -73.1
10	29./ 56.6	21./ 67.2	13./ 35.7	24./ 70.5	17./ 89.2
11	15./ -86.2	8./ 74.4	13./ 72.7	8./ 79.9	4./ -82.4
12	9./ 61.1	3./ -48.0	3./ 41.1	3./ -9.4	1./ 47.7
PEAK-TO-PEAK	6694.	2216.	2006.	2027.	1513.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 082 AIRCRAFT TOTAL WT = 32386. N LOADED CG X= 5.03 M = 198.2 IN  
 RUN NO. 35 7281. LB Y= -.00 = -.0  
 TIME 08001.68 (SEC) Z= 1.87 = 73.8

## Aerodynamic Flight State

T. AIRSPEED= 0.0 KT DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 A/C MACH NR= 0.000 STATIC PRES= 101.2 KPA = 2114. PSF  
 BODY ALPHAS= -48.8 DEG TOTAL TEMP= 299.0 DEG K = 538.2 DEG R  
 BODY BETAS= 45.4 DEG STATIC TEMP= 299.0 DEG K = 538.2 DEG F  
 DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 DENSITY ALT= 393. M = 1288. FT  
 SONIC SPEED= 347.2 M/SEC = 1139. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## Inertial Flight State

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	0.00	0.0	.011	0.00	0.0	.014	KOLL	.7	-.002	.019
Y	0.00	0.0	-.013	0.00	0.0	-.009	PITCH	1.2	.010	-.015
Z	0.00	0.0	-1.012	0.00	0.0	-1.012	YAW	17.8	-.018	-.019

## Control Angles

M.R. COLL= 9.9 DEG HORIZ FIN= 6.5 DEG  
 A1= -1.3 DEG T.R. CULL= 8.7 DEG  
 B1= .3 DEG PEDAL POS= 9.0 DEG

## Rotor Parameters

SHFT ALPHA= 0.0 DEG HUB HEIGHT = 1.9 R  
 HOVER TIP MACH= .05 CONTRGL ALPHA= -.3 DEG  
 TIP MAX-MACH= .66 DELTA PSI= 0.0 DEG  
 TIP MIN-MACH= .66  
 .9R MAX-MACH= .59  
 .9K MIN-MACH= .59 THRUST FACTOR= .873E+07 N = .196E+07 LB

## NASA Langley Flight Data AH-1G ---- Rotor Performance and Loads

FLIGHT NO. 82 MU=0.000 TOTAL CQ= .000278 AMB TEMP= 25.9 C = 78.5 F  
 RUN NO. 35 V= 0.0 KT MAST CQ= .000231 TEMP U60= 39.9 C = 103.7 F  
 TIME 68001.68 NZ= 1.021 G OMEGA= 34.040 RAD/SEC CAN TEMP= 30.8 C = 87.3 F  
 CLP= .00371 KPM/324= 1.003

ROTOR ANGLES THETA 3/4 (DEG) A0= 7.8 A1= -1.4 B1= .6 PEAK-TO-PEAK= 3.0  
 TFLTER ANG (DEG) A2= .2 A3= .4 A4= .4 B2= -.5 B3= -.5 PEAK-TO-PEAK= 1.3

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	42136.	1121.	-2793.	-2767.	-430.
HARMONIC-1	3064./ -60.3	b22./ -63.4	219./ -50.2	1012./ 69.2	31./ 15.0
2	1762./ 70.7	462./ 72.4	7b./ 54.3	73./ 10.9	24./ 53.1
3	1395./ -23.1	344./ -19.8	69./ -21.9	102./ -72.2	52./ 14.2
4	266./ -5.3	140./ -54.3	47./ -69.0	97./ -23.6	18./ -63.8
5	590./ 68.2	143./ 80.6	40./ 89.2	37./ -72.6	15./ 69.5
6	600./ -37.6	309./ -24.7	100./ -21.9	39./ -21.4	11./ -41.6
7	187./ 7.0	61./ -27.7	16./ -47.9	75./ 25.5	4./ 75.3
8	4./ -41.8	17./ 48.9	8./ -9.4	27./ -45.1	3./ -68.7
9	62./ 27.3	65./ -21.0	26./ -17.9	51./ -61.1	3./ 47.3
10	85./ 29.1	65./ -68.9	12./ -60.5	79./ 23.4	6./ 71.4
11	156./ 58.5	59./ -81.4	29./ 86.5	46./ -80.0	12./ 83.6
12	13./ -79.3	7./ 54.4	4./ -35.3	11./ 17.2	4./ -52.6
PLAK-TU-PEAK	10577.	3044.	834.	2637.	233.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803  
 (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN	-1139.	-77.	-60.	-223.	-236.
HARMONIC-1	68./ -65.2	71./ 26.1	95./ 11.3	161./ -7.6	171./ -25.7
2	45./ -87.9	31./ -28.0	43./ -18.1	66./ -27.7	81./ -41.6
3	51./ 22.1	57./ -8.0	34./ -10.0	48./ -14.3	21./ -19.8
4	71./ -54.9	38./ -69.9	17./ -72.9	20./ -63.2	36./ -72.0
5	9./ 54.7	6./ 1.6	6./ 60.3	4./ 51.8	4./ 38.1
6	28./ 86.4	7./ 36.5	8./ 89.7	12./ 56.6	16./ -77.1
7	29./ 51.6	12./ 39.2	22./ 37.6	1./ 1.7	18./ 28.4
8	13./ -89.3	8./ 88.8	14./ -88.5	5./ -36.6	3./ -56.8
9	17./ -81.3	14./ -66.2	9./ -60.5	17./ -65.3	16./ -54.1
10	29./ -4.4	19./ -.2	18./ -26.5	21./ 4.2	16./ 24.6
11	9./ -82.6	18./ 81.9	5./ 77.5	15./ -89.9	11./ -87.1
12	12./ 86.9	7./ -35.1	4./ 55.9	6./ 87.9	6./ -51.7
PEAK-TU-PEAK	448.	366.	396.	500.	506.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 062 AIRCRAFT TOTAL WT = 32409. N  
 RUN NO. 35 7266. LB  
 TIME 68001.60 (SEC)

LOADED CG X= 5.03 M = 198.2 IN  
 Y= -.00 = -.0  
 Z= 1.87 = 73.8

AERODYNAMIC FLIGHT STATE

T<sub>0</sub> AIRSPEED= 0.0 KT  
 A/C MACH NO= 0.000

BODY ALPHA= -48.6 DEG  
 BODY BETA= 46.6 DEG

DYNAMIC PRES= 0.00 KPA = 0.0 PSF  
 STATIC PRES= 101.2 KPA = 2114. PSF  
 TOTAL TEMP= 299.0 DEG K = 538.2 DEG R  
 STATIC TEMP= 299.0 DEG K = 538.2 DEG K

DENSITY= 1.18 KG/M3 = .00229 SLUG/FT3  
 DENSITY ALT= 392. M = 1286. FT  
 SONIC SPEED= 347.2 M/SEC = 1139. FPS  
 RATE OF CLIMB= 0. M/MIN = 0. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)
X	0.00	0.0	0.00	0.0	ROLL	.6	-.009	-.047
Y	0.00	0.0	0.00	0.0	PITCH	1.2	.007	-.048
Z	0.00	0.0	-1.021	0.00	YAW	17.8	-.013	.02e

CONTROL ANGLES

M.R. COLL= 10.0 DEG  
 A1= -1.1 DEG  
 B1= 1.0 DEG

HORIZ FIN= 6.6 DEG  
 T.R. COLL= 8.7 DEG  
 PEDAL POS= 9.0 DEG

ROTOR PARAMETERS

SHFT ALPHA= 0.0 DEG  
 CONTROL ALPHA= -1.0 DEG

HOVER TIP MACH= .66

TIP MAX-MACH= .66  
 TIP MIN-MACH= .56  
 .9R MAX-MACH= .59  
 .9R MIN-MACH= .59

THRUST FACTOR= .873E+07 N = .196E+07 LB

HUB HEIGHT = 1.9 R

NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 062 MU=0.000 TOTAL CQ= .000280 AMB TEMP= 25.3 C = 78.46 F  
 RUN NO. 35 V= 0.0 KT MAST CQ= .000238 TEMP U60= 39.9 C = 103.75 F  
 TIME 68001.13 NZ= 1.016 G CMEGA= 34.116 RAD/SEC CAN TEMP= 30.5 C = 87.39 F  
 CLP= .00376 RPM/324= 1.006

ROTATOR ANGLES

THETA 3/4 (DEG)	A0= 7.8	A1= -1.6	B1= .1	PEAK-TO-PEAK= 3.2
TEETER ANG (DEG)	A0= .2	A1= .7	B1= -.7	PEAK-TO-PEAK= 1.8
URAG BRACE (N/DEG)	CHORD .449	CHORD .803	PITCH LINK (N/DEG)	TORSION .449
(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)	(N-M/DEG)

MEAN 41661. 1281. -2768. -2704. -427.

HARMONIC-1 2166./ -18.9 707./ -20.3 216./ -20.3 954./ -79.9 22./ -3.0

2 1078./ 79.1 271./ 76.1 30./ -80.5 99./ -19.2 17./ 79.2

3 1042./ 45.8 247./ 46.9 49./ 44.0 124./ -50.0 29./ 69.4

4 237./ -78.2 125./ -45.0 37./ -33.3 88./ 57.0 21./ -38.0

5 168./ -63.5 41./ 67.8 6./ -42.6 99./ -6.5 16./ 4.1

6 293./ -89.4 133./ 78.3 33./ -86.9 60./ 54.7 8./ 51.9

7 100./ 57.0 14./ 22.8 8./ 78.2 44./ -65.9 6./ -68.0

8 122./ 5.9 73./ 10.1 24./ 9.1 29./ 63.5 1./ 33.1

9 61./ -31.1 29./ -25.9 7./ -38.4 14./ -26.8 3./ 16.0

10 48./ 10.0 52./ 31.5 20./ 33.1 44./ 88.2 1./ 36.6

11 96./ 35.3 19./ 69.7 7./ 61.2 24./ 49.6 6./ 73.9

12 78./ -85.1 18./ 46.4 16./ -66.8 19./ 65.3 4./ 23.1

PEAK-TO-PEAK 6124. 2117. 675. 2009. 162.

BEAM .174 BEAM .350 BEAM .449 BEAM .606 BEAM .803

(N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG) (N-M/DEG)

MEAN -1114. -70. -60. -224. -240.

HARMONIC-1 55./ 23.9 63./ 8.5 95./ 9.0 172./ -5.8 178./ -19.4

2 48./ 54.3 34./ 13.8 38./ -2.8 57./ -10.4 89./ -31.1

3 27./ 11.3 38./ 6.9 29./ 12.5 21./ 10.2 8./ -40.8

4 29./ -4.4 18./ -18.3 13./ -34.1 14./ 79.4 18./ 50.9

5 50./ 66.2 13./ 70.5 9./ 63.8 20./ 72.1 8./ 72.1

6 36./ 38.5 4./ -26.2 9./ 28.1 15./ 2.4 13./ 37.7

7 20./ -36.6 9./ -60.0 17./ -59.2 8./ 75.9 18./ -71.7

8 6./ -23.1 4./ 40.8 3./ 15.5 2./ -64.6 5./ 38.5

9 11./ 33.1 8./ -6.7 6./ -19.0 11./ 28.1 8./ 44.7

10 9./ -86.3 11./ 86.7 10./ -89.9 8./ -86.5 6./ -57.0

11 4./ 75.2 10./ 62.5 3./ 4.8 7./ 77.6 4./ -78.0

12 3./ -61.8 5./ 42.8 1./ 44.8 4./ -43.4 1./ 81.1

PEAK-TO-PEAK 288. 235. 292. 400. 461.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 083 AIRCRAFT TOTAL WT = 35216. N  
 RUN NO. 17 7917. LB  
 TIME 51948.20 (SEC)

LOADED CG X= 5.11 M = 201.1 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.1

## AERODYNAMIC FLIGHT STATE

T. AIRSPEED= 108.5 KT  
 A/C MACH NO= .164

BODY ALPHAS= 3.9 DEG  
 BODY BETA= 2.1 DEG

DYNAMIC PRES= 1.73 KPA = 36.1 PSF  
 STATIC PRES= 90.9 KPA = 1898. PSF  
 TOTAL TEMP= 288.7 DEG K = 519.7 DFG R  
 STATIC TEMP= 287.2 DEG K = 516.9 DFG R

DENSITY= 1.10 KG/M3 = .00214 SLUG/FT3  
 DENSITY ALT= 1082. M = 3549. FT  
 SONIC SPEED= 340.3 M/SEC = 1116. FPS  
 RATE OF CLIMB= -413. M/MIN = -1356. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.66	182.6	-.050	55.65	182.6	-.045	ROLL	-1.2	-.003	.044
Y	2.05	6.7	-.016	2.05	6.7	-.007	PITCH	-3.3	.005	-.027
Z	3.75	12.3	-1.028	3.76	12.3	-1.028	YAW	195.9	.005	.015

CONTROL ANGLES

M.R. COLL=	7.6 DEG	HORIZ FIN=	7.9 DEG
A1=	1.2 DEG	T.R. COLL=	.9 DEG
B1=	4.6 DEG	PEDAL POS=	1.3 DEG

ROTOR PARAMETERS

HOVER TIP MACH= .68	SHAFT ALPHA= 3.9 DEG
	CONTROL ALPHA= -.7 DEG
TIP MAX-MACH= .84	DELTA PSI= -2.1 DEG
TIP MIN-MACH= .51	
.9R MAX-MACH= .77	ENGINE POWER= 241. KW = 323. HP
.9R MIN-MACH= .44	THRUST FACTOR= .822E+07 N = .185E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 83 MU= .242 TOTAL CO= .000127 AMB TEMP= 14.0 C = 57.26 F  
 RUN NO. 17 V= 108.5 KT MAST CO= .000111 TFMP 1460= 32.2 C = 90.00 F  
 NZ= 1.028 G OMEGA= 34.355 RAD/SEC CAN TEMP= 23.8 C = 74.81 F  
 TIME 51948.08 CLP= .00438 RPM/324= 1.013

ROTOR ANGLES THETA 3/4 (DEG) AO= 6.3 A1= .2 B1= 4.9 PEAK-TO-PEAK= 9.7  
 TEETER ANG (DEG) AO= .2 A1= -1.6 B1= .5 PEAK-TO-PEAK= 3.1

ROTOR LOADS (AMP/PHASE) DRAG BRACE CHORD .449 CHORD .803 PITCH LINK TORSION .449  
 (N/DEG) (N-M/DEG) (N-M/DEG) (N/DEG) (N-M/DEG)

MEAN	48126.	-370.	-3487.	-1715.	-377.
HARMONIC-1	2282./ -.0	438./ 5.3	108./ -17.4	2235./ -36.6	319./ -56.5
2	681./ -10.1	207./ -37.0	21./ -83.5	1667./ -54.1	142./ -41.6
3	2316./ 17.2	548./ 21.9	93./ 23.3	301./ -34.0	60./ 1.6
4	467./ 24.5	341./ 16.5	152./ 6.5	511./ 59.8	105./ 18.9
5	533./ 16.4	120./ 53.7	58./ 60.4	274./ 6.0	40./ 58.1
6	443./ -78.8	203./ -77.6	63./ -83.0	150./ -71.1	20./ 80.4
7	79./ -52.4	70./ -31.0	33./ -51.5	135./ -30.1	15./ 19.3
8	48./ 15.0	24./ 47.5	9./ -10.1	35./ 24.3	12./ 22.1
9	67./ 12.9	45./ 34.6	18./ 32.9	62./ -77.7	7./ 17.8
10	83./ 26.6	112./ 71.0	56./ 66.7	38./ -.3	5./ 58.5
11	72./ -6.1	40./ 78.5	15./ 49.3	14./ 69.7	7./ 38.9
12	11./ -66.6	7./ 1.2	12./ -36.9	23./ -57.4	4./ -77.7
PEAK-TO-PEAK	8748.	2359.	822.	7475.	888.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2290.	-277.	-302.	-544.	-448.
HARMONIC-1	530./ -51.7	393./ -70.0	398./ -72.3	366./ -76.0	151./ 88.0
2	341./ -64.6	255./ -81.4	276./ -79.9	239./ -77.7	68./ -72.8
3	158./ 88.1	53./ -40.6	46./ 20.5	83./ 56.8	87./ 46.6
4	501./ 32.5	148./ 14.5	66./ 11.1	110./ 28.7	175./ 20.1
5	223./ -17.5	19./ -47.9	37./ 16.9	43./ -20.8	24./ 58.1
6	23./ 65.8	12./ -62.7	32./ -88.4	10./ 67.7	61./ -74.2
7	93./ -37.4	24./ -35.9	33./ -16.6	8./ -86.1	34./ 49.2
8	43./ -54.1	16./ -50.4	9./ -30.7	14./ -55.7	22./ -66.8
9	23./ 84.9	19./ -88.5	4./ 69.9	23./ -63.6	27./ -50.3
10	14./ -20.5	12./ -28.8	5./ -3.1	18./ -8.4	22./ -11.8
11	8./ -24.3	3./ -52.2	4./ -29.2	4./ -33.8	8./ -38.2
12	25./ 64.1	12./ 68.6	7./ 33.1	7./ 58.2	1./ 29.0
PEAK-TO-PEAK	2655.	1336.	1268.	1232.	845.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 083 AIRCRAFT TOTAL WT = 34933. N LOADED CG X= 5.11 M = 201.1 TN  
 RUN NO. 22 7854. LB Y= -.00 = -.0  
 TIME 52389.20 (SEC) Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.65 KPA = 34.4 PSF  
 T. AIRSPFED= 106.5 KT STATIC PRES= 90.0 KPA = 1879. PSF  
 A/C MACH NO= .161 TOTAL TEMP= 288.0 DEG K = 518.3 DEG R  
 BODY ALPHA= -8.1 DEG STATIC TEMP= 286.5 DEG K = 515.6 DEG R  
 BODY BETA= 1.3 DEG DENSITY= 1.09 KG/M3 = .00212 SLUG/FT3  
 SONIC SPEED= 339.9 M/SEC = 1115. FPS  
 RATE OF CLIMB= 374. M/MIN = 1228. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SFC)	ANG ACC (RAD/SEC2)		
X	54.20	177.8	-0.029	54.20	177.8	-0.029	ROLL	-.4	-.000	-.012
Y	1.27	4.2	.010	1.27	4.2	.008	PITCH	-1.6	.000	.001
Z	-7.70	-25.3	-1.014	-7.70	-25.3	-1.014	YAW	5.9	-.006	-.009

CONTROL ANGLES M.R. COLL= 13.1 DEG HORIZ FIN= 9.2 DEG  
 A1= -.3 DEG T.R. COLL= 3.9 DEG  
 B1= 6.6 DEG PEDAL POS= 4.0 DFG

ROTOR PARAMETERS SHAFT ALPHA= -8.1 DEG  
 HOVER TIP MACH= .66 CONTROL ALPHA= -14.7 DFG  
 TIP MAX-MACH= .82 DELTA PSI= -1.3 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .75 ENGINE POWER= 692. KW = 928. HP  
 .9R MIN-MACH= .43 THRUST FACTOR= .776E+07 N = .174E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .244	TOTAL CQ= .000395	AMB. TEMP= 13.3 C = 55.97 F		
RUN NO.	V= 106.5 KT	MAST CQ= .000367	TEMP U60= 32.1 C = 89.77 F		
TIME	NZ= 1.014 G	OMEGA= 33.523 RAD/SEC	CAN TEMP= 23.4 C = 74.12 F		
	CLP= .00453	RPM/324= .988			
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 11.1 A0= .3	A1= -1.0 A1= -2.0	B1= 7.0 B1= -.7	PFAK-TO-PEAK= 13.9 PFAK-TO-PEAK= 4.0
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	37144.	1363.	-2973.	-3707.	-548.
HARMONIC-1	5514/. -39.7	1194/. -45.2	246/. -46.0	2629/. -26.4	312/. -43.6
2	778/. -29.0	224/. -23.6	49/. -45.7	1020/. -63.0	137/. -67.9
3	2500/. 62.7	625/. 58.5	106/. 67.3	301/. -27.5	87/. 21.1
4	176/. -2.5	111/. 31.3	61/. 23.9	122/. 65.6	21/. 54.8
5	429/. -80.1	122/. 59.6	23/. 63.9	226/. -77.2	32/. -77.4
6	572/. -65.2	307/. -61.7	98/. -65.9	7/. -15.9	6/. -60.6
7	121/. 21.6	43/. 78.7	23/. 61.5	7/. 76.4	2/. -60.9
8	153/. 29.5	63/. 7.1	32/. 15.2	18/. 50.2	2/. -39.3
9	38/. -28.3	74/. 51.5	31/. 53.3	11/. -62.6	2/. 61.7
10	13/. -36.5	40/. -89.8	13/. -85.0	18/. 82.9	4/. 51.4
11	34/. 32.3	24/. -14.9	14/. 34.7	10/. -70.9	5/. 60.7
12	20/. -65.0	23/. 17.6	18/. 19.3	8/. -33.9	3/. 17.4
PEAK-TO-PEAK	16397.	4062.	856.	6352.	799.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1664.	-103.	-140.	-410.	-453.
HARMONIC-1	1114/. -59.1	420/. -66.6	405/. -66.8	382/. -69.2	156/. 89.0
2	234/. -53.2	175/. -84.8	186/. -81.1	174/. -69.0	103/. -38.6
3	101/. -7.3	49/. 72.5	61/. 81.2	88/. -82.2	73/. -68.1
4	109/. 58.7	33/. 42.3	19/. 38.2	27/. 54.4	59/. 43.0
5	87/. -89.3	9/. 33.2	2/. -68.0	8/. 62.4	20/. 53.8
6	47/. -57.8	5/. 59.5	5/. -34.5	3/. 64.0	2/. 47.5
7	23/. -29.6	8/. -22.4	13/. -38.3	5/. -30.6	18/. -31.9
8	18/. 66.5	4/. 75.3	2/. 15.7	3/. -50.5	8/. 5.8
9	15/. -82.8	8/. -60.9	3/. -28.9	12/. -39.9	11/. -18.6
10	18/. -62.3	7/. -58.2	6/. -38.0	7/. -61.1	6/. -53.0
11	9/. 71.9	1/. 59.0	1/. 51.9	2/. 37.5	2/. -88.2
12	4/. 16.4	1/. -14.0	0/. -81.4	2/. 80.6	0/. 44.4
PEAK-TO-PEAK	2695.	1031.	1004.	1053.	528.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 083 AIRCRAFT TOTAL WT = 34935. N  
 RUN NO. 23 7854. LB  
 TIME 52442.20 (SEC) LOADED CG X= 5.11 M = 201.1 IN  
 Y= -.00 = -.0  
 Z= 1.83 = 72.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.71 KPA = 35.8 PSF  
 T. AIRSPEED= 108.1 KT STATIC PRES= 90.9 KPA = 1898. PSF  
 A/C MACH NO= .164 TOTAL TEMP= 288.7 DEG K = 519.6 DEG R  
 BODY ALPH-A= 4.9 DEG STATIC TEMP= 287.1 DEG K = 516.8 DEG R  
 BODY BETA= .8 DEG DENSITY= 1.10 KG/M3 = .00214 SLUG/FT3  
 DENSITY ALT= 1084. M = 3555. FT  
 SONIC SPEED= 340.3 M/SEC = 1116. FPS  
 RATE OF CLIMB= -452. M/MIN = -1481. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	55.40	181.8	-0.065	55.41	181.8	-0.066	ROLL	.7	.009	.016
Y	.74	2.4	-0.001	.75	2.5	.002	PITCH	-2.9	-0.000	.006
Z	4.70	15.4	-1.047	4.70	15.4	-1.047	YAW	3.0	.001	-.022

CONTROL ANGLES M.R. COLL= 7.0 DEG HORIZ FIN= 7.3 DEG  
 A1= 1.2 DEG T.R. COLL= .3 DEG  
 B1= 3.5 DEG PEDAL POS= .8 DEG

ROTOR PARAMETERS SHAFT ALPHA= 4.9 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= 1.4 DEG  
 TIP MAX-MACH= .84 DELTA PSI= -.8 DEG  
 TIP MIN-MACH= .51  
 .9R MAX-MACH= .77 ENGINE POWER= 193. KW = 259. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .813E+07 N = .183E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 83	MU= .243	TOTAL CO= .000103	AMB TEMP= 14.0 C = 57.17 F		
RUN NO. 23	V= 108.1 KT	MAST CO= .000088	TEMP U60= 31.5 C = 88.78 F		
TIME 52442.06	NZ= 1.047 G	OMEGA= 34.190 RAD/SEC	CAN TEMP= 23.0 C = 73.42 F		
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 5.7	A1= -.0	B1= 3.8	PFAK-TO-PEAK= 7.7
	TEETER ANG (DEG)	A0= .2	A1= -1.0	B1= .5	PFAK-TO-PEAK= 2.1
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	48677.	-529.	-3468.	-1390.	-356.
HARMONIC-1	2609./ 4.7	483./ 7.2	115./ -14.9	2286./ -36.4	310./ -55.4
2	519./ -80.6	64./ 75.5	19./ -11.0	1176./ -53.3	95./ -37.8
3	1990./ 18.6	450./ 23.2	75./ 30.3	309./ -24.1	49./ 12.7
4	541./ 49.5	325./ 26.9	142./ 13.2	395./ 66.3	83./ 20.3
5	581./ 17.5	141./ 40.0	67./ 61.2	271./ 12.6	35./ 63.5
6	409./ -50.2	235./ -26.9	69./ -40.9	182./ -78.3	24./ 86.2
7	77./ 57.4	58./ -85.0	28./ -85.6	70./ -11.1	11./ 40.4
8	70./ 43.7	46./ 27.9	14./ 57.6	31./ 62.5	11./ 45.3
9	30./ 32.9	58./ 82.3	22./ 86.1	46./ -29.4	1./ -24.7
10	132./ -6.4	78./ 81.1	51./ 78.3	41./ 65.2	6./ -72.7
11	49./ -27.6	41./ 20.2	24./ 20.4	34./ -66.2	8./ 55.0
12	11./ -89.8	3./ -74.5	17./ -33.4	19./ 78.7	6./ -36.5
PEAK-TO-PEAK	8742.	2208.	786.	6599.	771.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2298.	-280.	-310.	-554.	-461.
HARMONIC-1	544./ -47.5	402./ -65.7	409./ -67.9	361./ -73.7	146./ 89.7
2	313./ -61.8	227./ -79.1	253./ -76.0	231./ -72.7	89./ -70.8
3	153./ -62.8	60./ -29.5	50./ 21.7	81./ 65.8	80./ 60.4
4	435./ 33.3	135./ 17.5	57./ 22.5	93./ 25.0	162./ 22.5
5	211./ -7.8	22./ -41.5	33./ 34.5	42./ -6.9	28./ 77.8
6	53./ 48.2	17./ -64.4	36./ -87.5	13./ 36.8	62./ -70.3
7	55./ -30.7	9./ -1.0	17./ 20.4	5./ -67.2	23./ -83.8
8	39./ -32.5	10./ -14.9	6./ 12.1	9./ -38.0	17./ -46.3
9	24./ -56.2	15./ -34.0	2./ -43.6	21./ -25.2	24./ -18.9
10	28./ 41.9	21./ 29.7	10./ 35.9	20./ 29.5	21./ 24.3
11	2./ 35.0	4./ -49.4	2./ 50.7	1./ 21.4	4./ -13.4
12	9./ -69.6	9./ -64.7	5./ 65.2	5./ -85.8	2./ -87.2
PEAK-TO-PEAK	2483.	1299.	1241.	1132.	799.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 083 AIRCRAFT TOTAL WT = 34854. N  
 RUN NO. 24 7836. LB  
 TIME 52515.00 (SEC) LOADED CG X= 5.11 M = 201.1 IN  
 Y= -.00 = -.0  
 Z= 1.84 = 72.3

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.66 KPA = 34.6 PSF  
 STATIC PRES= 90.4 KPA = 1889. PSF  
 T. AIRSPEED= 106.5 KT TOTAL TEMP= 288.4 DEG K = 519.0 DEG R  
 A/C MACH NO= .161 STATIC TEMP= 286.9 DEG K = 516.4 DEG R  
 BODY ALPHA= -9.6 DEG DENSITY= 1.10 KG/M3 = .00213 SLUG/FT3  
 BODY BETA= 2.3 DEG DENSITY ALT= 1122. M = 3683. FT  
 SONIC SPEED= 340.1 M/SEC = 1116. FPS  
 RATE OF CLIMB= 518. M/MIN = 1699. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	53.97	177.1	-0.013	53.95	177.0	-0.014	ROLL	.3	.008	.050
Y	2.16	7.1	.004	2.17	7.1	.014	PITCH	-.5	.007	.002
Z	-9.15	-30.0	-1.052	-9.16	-30.0	-1.052	YAW	5.2	-.001	-.010

CONTROL ANGLES M.R. COLL= 14.1 DEG HORIZ FIN= 9.6 DEG  
 A1= -.4 DEG T.R. COLL= 4.5 DEG  
 B1= 7.0 DEG PEDAL POS= 4.8 DFG

ROTOR PARAMETERS SHAFT ALPHA= -9.6 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -16.7 DFG  
 TIP MAX-MACH= .83 DELTA PSI= -2.3 DEG  
 TIP MIN-MACH= .51  
 .9R MAX-MACH= .76 ENGINE POWER= 803. KW = 1077. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .800E+07 N = .180E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .240	TOTAL CQ= .000438	AMR TEMP= 13.7 C = 56.69 F		
RUN NO.	V= 106.5 KT	MAST CQ= .000410	TEMP U60= 31.9 C = 89.40 F		
TIME	NZ= 1.052 G	OMEGA= 34.000 RAD/SEC	CAN TEMP= 23.4 C = 74.12 F		
	CLP= .00454	RPM/324= 1.002			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 11.7	A1= -1.0	B1= 7.3	PEAK-TO-PEAK= 14.7
	TEETER ANG (DEG)	A0= .3	A1= -2.3	B1= -.8	PEAK-TO-PEAK= 4.6
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (IN-M/DEG)	CHORD .449 (IN-M/DEG)	CHORD .803 (IN-M/DEG)	PITCH LINK (IN/DEG)	TORSION .449 (IN-M/DEG)
MEAN	35677.	1686.	-3029.	-4181.	-591.
HARMONIC-1	5735./ -50.3	1256./ -56.5	245./ -53.5	2763./ -24.9	321./ -44.1
2	1093./ -80.3	294./ -71.0	73./ -84.9	929./ -72.7	131./ -75.2
3	2433./ 57.4	624./ 51.8	104./ 62.2	253./ -28.2	85./ 21.9
4	287./ 39.4	153./ 37.5	58./ 28.5	132./ 65.9	12./ 41.1
5	386./ -81.6	126./ 70.6	21./ 72.2	294./ -71.3	53./ -71.2
6	765./ -85.0	434./ -78.5	135./ -79.5	51./ 57.2	13./ 81.1
7	38./ -18.7	45./ 3.8	11./ 9.2	37./ 47.7	6./ 47.1
8	144./ -20.3	83./ .8	33./ -6.6	16./ 21.7	1./ -69.8
9	27./ -2.2	71./ 46.7	25./ 38.3	37./ -63.4	3./ 39.6
10	53./ -74.2	33./ -42.2	17./ -33.2	42./ 88.9	2./ 86.3
11	15./ -83.1	27./ 75.5	15./ 49.1	24./ 50.3	4./ 37.3
12	87./ 53.4	32./ -31.3	11./ -32.5	5./ 76.9	3./ -20.6
PEAK-TO-PEAK	16370.	3930.	786.	6726.	772.
	BEAM .174 (IN-M/DEG)	BEAM .350 (IN-M/DEG)	BEAM .449 (IN-M/DEG)	BEAM .606 (IN-M/DEG)	BEAM .803 (IN-M/DEG)
MEAN	-1501.	-81.	-120.	-398.	-457.
HARMONIC-1	1207./ -64.0	420./ -69.0	400./ -68.5	380./ -70.8	163./ 87.2
2	244./ -69.1	171./ 88.2	175./ -85.8	170./ -70.6	110./ -39.5
3	92./ -16.4	53./ 67.4	66./ 74.7	84./ -88.6	68./ -71.1
4	110./ 61.5	32./ 44.4	17./ 44.3	21./ 64.6	46./ 43.1
5	97./ 86.2	6./ 35.8	5./ 70.9	10./ 63.7	10./ 37.4
6	45./ -78.7	3./ -66.1	5./ 88.8	6./ -77.9	11./ 35.3
7	33./ -6.4	8./ -47.1	14./ -38.7	4./ -11.7	17./ -20.2
8	16./ 61.8	4./ 70.2	4./ 19.1	2./ -29.8	5./ 7.5
9	13./ -67.7	5./ -9.3	2./ -48.0	9./ -15.1	10./ -10.8
10	26./ -82.1	8./ 76.4	7./ -75.8	10./ -89.8	9./ -81.0
11	9./ -73.0	2./ -33.8	0./ -.5	1./ -33.6	1./ -19.8
12	5./ 68.5	1./ 21.5	3./ -5.7	1./ 5.6	1./ -57.7
PEAK-TO-PEAK	2870.	1016.	1000.	1033.	560.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 083 AIRCRAFT TOTAL WT = 34778. N LOADED CG X= 5.11 M = 201.1 TN  
 RUN NO. 25 7819. LB Y= -.00 = -.0  
 TIME 52732.50 (SEC) Z= 1.84 = 72.3

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.71 KPA = 35.8 PSF  
 STATIC PRES= 91.5 KPA = 1911. PSF  
 T. AIRSPFED= 107.8 KT TOTAL TEMP= 289.1 DEG K = 520.4 DEG R  
 A/C MACH NO= .163 STATIC TEMP= 287.6 DEG K = 517.6 DEG R  
 BODY ALPHA= 11.0 DEG DENSITY= 1.11 KG/M3 = .00215 SLUG/FT3  
 BODY BETA= -2.3 DEG DENSITY ALT= 1028. M = 3374. FT  
 SONIC SPEED= 340.5 M/SEC = 1117. FPS  
 RATE OF CLIMB= -800. M/MIN = -2624. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.40	178.5	-0.079	54.39	178.4	-0.079	ROLL	-.0	-.010	-.012
Y	-2.19	-7.2	.019	-2.21	-7.3	.017	PITCH	-2.9	.003	.001
Z	10.58	34.7	-1.082	10.58	34.7	-1.082	YAW	170.1	.002	-.019

CONTROL ANGLES M.R. COLL= 3.5 DEG HURIZ FIN= 6.7 DEG  
 A1= 2.0 DEG T.R. COLL= -1.1 DFG  
 B1= 1.9 DEG PEDAL POS= -.6 DEG

ROTOR PARAMETERS SHAFT ALPHA= 11.0 DFG  
 HOVER TIP MACH= .69 CONTROL ALPHA= 9.2 DEG  
 TIP MAX-MACH= .85 DELTA PSI= 2.3 DEG  
 TIP MIN-MACH= .52  
 .9R MAX-MACH= .78 ENGINE POWER= 12. KW = 17. HP  
 .9R MIN-MACH= .46 THRUST FACTOR= .859E+07 N = .193F+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 83	MU= .236	TOTAL CO= .000006	AMB TEMP= 14.4 C = 57.92 F		
RUN NO. 25	V= 107.8 KT	MAST CO=-.000009	TEMP U60= 30.8 C = 87.50 F		
TIME 52732.41	NZ= 1.082 G	OMEGA= 35.010 RAD/SEC	CAN TEMP= 21.8 C = 71.32 F		
ROTOR ANGLES	THETA 3/4 (DEG) TEETER ANG (DEG)	A0= 2.8 A0= .1	A1= .4 A1= -.9	B1= 2.2 B1= 1.1	PEAK-TO-PEAK= 4.6 PEAK-TO-PEAK= 2.8
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	54853.	-1415.	-3889.	257.	-229.
HARMONIC-1	2915./ 45.4	609./ 53.5	100./ 19.2	2659./ -28.2	297./ -49.6
2	188./ -80.6	114./ -69.2	45./ 86.6	908./ -33.9	89./ -33.7
3	1493./ 28.5	337./ 39.5	67./ 53.6	417./ -21.5	37./ -.8
4	407./ 50.6	341./ 31.1	147./ 22.1	440./ 70.1	79./ 46.7
5	454./ 46.9	114./ -88.8	48./ -79.4	183./ 62.0	30./ -71.8
6	397./ 22.8	238./ 23.1	72./ 16.8	110./ -23.6	16./ -11.5
7	58./ 13.8	84./ -79.5	30./ -85.8	21./ 4.8	9./ -44.9
8	93./ -61.6	24./ -46.8	16./ -13.4	24./ 26.4	3./ -74.5
9	83./ 73.4	105./ -71.0	63./ -62.2	54./ -74.9	4./ 11.4
10	48./ 25.4	43./ -46.5	17./ -77.8	63./ 25.0	10./ 2.7
11	28./ 67.4	8./ 75.9	17./ -13.5	26./ 10.8	10./ -84.1
12	60./ -3.7	9./ -80.2	6./ 33.4	7./ -11.6	7./ 70.2
PEAK-TO-PEAK	10168.	2692.	696.	6593.	698.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-2342.	-331.	-367.	-602.	-469.
HARMONIC-1	488./ -32.2	394./ -58.7	402./ -60.4	348./ -65.3	126./ -84.3
2	235./ -44.4	185./ -66.5	208./ -66.1	204./ -66.0	90./ -71.8
3	276./ -30.0	83./ -19.5	51./ 27.7	99./ 83.1	119./ 88.1
4	496./ 38.6	142./ 23.7	54./ 30.2	97./ 26.7	171./ 25.4
5	182./ 16.6	18./ -9.0	26./ 70.6	36./ 20.0	28./ -62.0
6	61./ 76.1	19./ -.0	31./ -42.3	16./ 81.0	55./ -28.9
7	13./ -31.0	4./ -85.5	10./ 9.7	12./ 15.1	35./ 12.5
8	25./ 42.9	5./ 11.1	6./ -62.1	9./ 37.2	24./ 32.4
9	27./ 86.7	18./ -81.3	6./ -85.9	21./ -78.2	23./ -88.7
10	28./ -25.1	8./ 7.3	7./ -33.6	8./ -12.6	7./ -35.1
11	13./ 63.4	8./ 58.6	5./ 86.9	5./ 79.2	1./ -53.5
12	22./ 62.9	9./ -89.1	11./ 55.6	8./ 69.8	3./ 81.9
PEAK-TO-PEAK	2227.	1224.	1108.	1052.	791.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 383 AIRCRAFT TOTAL WT = 34657. N  
 RUN NO. 26 7792. LB  
 TIME 52833.00 (SEC) LOADED CG X= 5.11 M = 201.1 IN  
 Y= -.00 = -.0  
 Z= 1.84 = 72.3

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.70 KPA = 35.5 PSF  
 STATIC PRES= 89.6 KPA = 1871. PSF  
 T. AIRSPEED= 108.3 KT TOTAL TEMP= 287.7 DEG K = 517.8 DEG R  
 A/C MACH NO= .164 STATIC TEMP= 286.1 DEG K = 515.1 DEG R  
 BODY ALPH4= -10.5 DEG DENSITY= 1.09 KG/M3 = .00212 SLUG/FT3  
 BODY BETA= 1.8 DEG DENSITY ALT= 1192. M = 3910. FT  
 SONIC SPEED= 339.7 M/SEC = 1114. FPS  
 RATE OF CLIMB= 716. M/MIN = 2351. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATE (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.77	179.7	-0.007	54.75	179.6	-0.011	ROLL	-.2	-.005	.011
Y	1.78	5.9	.008	1.77	5.8	.010	PITCH	1.9	.011	.020
Z	-10.12	-33.2	-1.056	-10.13	-33.2	-1.056	YAW	172.4	.004	-.004

CONTROL ANGLES M.R. COLL= 14.9 DEG HORIZ FIN= 10.0 DEG  
 A1= -.5 DEG T.R. COLL= 4.9 DEG  
 R1= 7.6 DEG PEDAL POS= 5.1 DEG

ROTOR PARAMETERS SHAFT ALPHA= -10.5 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -18.0 DEG  
 TIP MAX-MACH= .83 DELTA PSI= -1.9 DEG  
 TIP MIN-MACH= .50  
 .9R MAX-MACH= .77 ENGINE POWER= 863. KW = 1158. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .795E+07 N = .179E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .244	TOTAL CQ= .000474	AMB TEMP= 13.0 C = 55.39 F		
RUN NO.	V= 108.3 KT	MAST CQ= .000441	TEMP U60= 31.9 C = 89.37 F		
TIME	NZ= 1.056 G	OMEGA= 33.997 RAD/SEC	CAN TEMP= 22.6 C = 72.72 F		
	CLP= .00457	RPM/324= 1.002			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 12.4	A1= -1.1	B1= 8.0	PEAK-TO-PEAK= 16.2
	TEETER ANG (DEG)	A0= .3	A1= -2.5	B1= -.8	PEAK-TO-PEAK= 4.9
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	35581.	1989.	-2866.	-4419.	-614.
HARMONIC-1	6242./ -45.6	1422./ -50.6	288./ -46.9	2969./ -24.2	326./ -40.5
2	576./ -43.0	188./ -23.0	48./ -56.7	1082./ -64.4	150./ -68.9
3	2872./ 61.3	725./ 58.0	124./ 65.1	252./ -31.2	94./ 21.5
4	151./ -36.1	136./ 15.4	55./ 16.4	146./ 76.0	14./ 44.9
5	468./ -78.0	139./ -81.9	28./ -77.6	300./ -71.9	56./ -76.8
6	525./ -71.8	312./ -74.0	105./ -75.7	73./ -15.7	5./ 47.5
7	94./ 76.9	11./ 79.4	4./ 44.7	26./ 59.3	5./ 38.2
8	110./ -36.7	76./ -.5	24./ -18.3	15./ 35.1	3./ 70.7
9	61./ -65.3	65./ 34.3	29./ 26.6	33./ -52.0	1./ 62.6
10	59./ -14.3	13./ 63.5	16./ -82.6	49./ 69.5	2./ 70.6
11	47./ 84.3	10./ 85.1	17./ 42.1	14./ -74.1	3./ 47.5
12	33./ -68.7	30./ -21.4	7./ -15.6	10./ 4.7	5./ -41.6
PEAK-TO-PEAK	18024.	4321.	865.	7219.	855.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1378.	-61.	-106.	-385.	-464.
HARMONIC-1	1382./ -61.3	446./ -67.4	412./ -67.2	390./ -70.2	166./ 84.7
2	236./ -50.6	167./ -87.3	177./ -82.7	165./ -67.5	107./ -31.8
3	134./ -.8	55./ 81.7	75./ 84.5	97./ -87.8	73./ -74.9
4	103./ 74.2	28./ 54.5	16./ 39.8	23./ 75.1	42./ 52.5
5	93./ 87.5	6./ 51.0	7./ 67.2	9./ 59.0	11./ 35.9
6	29./ -75.5	6./ -74.4	4./ -15.1	3./ -87.8	9./ -4.7
7	23./ 11.7	7./ -52.6	9./ -18.5	5./ -7.4	12./ -17.8
8	18./ 70.9	5./ -73.6	5./ 35.3	5./ -24.6	6./ 1.7
9	15./ -46.8	8./ -30.2	2./ -1.2	10./ -10.9	9./ -16.2
10	26./ 74.3	11./ 52.6	6./ 74.3	12./ 66.8	11./ 71.6
11	4./ -72.6	1./ 86.2	1./ -60.9	1./ -89.6	2./ 65.7
12	2./ 76.0	1./ 44.4	3./ 20.4	1./ -47.7	1./ -79.6
PEAK-TO-PEAK	3323.	1077.	1053.	1072.	528.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 084 AIRCRAFT TOTAL WT = 33744. N LOADED CG X= 5.03 M = 198.2 IN  
 RUN NO. 8 7586. LB Y= -.00 = -.0  
 TIME \*\*\*\*\* (SEC) Z= 1.85 = 72.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.61 KPA = 33.6 PSF  
 T. AIRSPFED= 106.5 KT STATIC PRES= 87.3 KPA = 1822. PSF  
 A/C MACH NO= .162 TOTAL TEMP= 286.5 DEG K = 515.6 DEG R  
 BODY ALPHA= -1.5 DEG STATIC TEMP= 285.0 DEG K = 512.9 DEG R  
 BODY BETA= 2.4 DEG DENSITY= 1.07 KG/M3 = .00207 SLUG/FT3  
 DENSITY ALT= 1417. M = 4649. FT  
 SONIC SPEED= 339.0 M/SEC = 1112. FPS  
 RATE OF CLIMB= -76. M/MIN = -249. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	54.71	179.5	-0.077	54.52	178.9	-0.085	ROLL	1.8	.019	.029
Y	2.25	7.4	-0.017	2.29	7.5	-0.010	PITCH	-2.8	.093	.040
Z	-1.45	-4.8	-1.204	-1.45	-4.7	-1.202	YAW	178.2	-.013	.019

CONTROL ANGLES M.R. COLL= 10.0 DEG HORIZ FIN= 7.1 DEG  
 A1= .6 DEG T.R. COLL= 1.7 DEG  
 B1= 2.9 DEG PEDAL POS= 2.1 DFG

ROTOR PARAMETERS SHAFT ALPHA= -1.5 DEG  
 HOVER TIP MACH= .67 CONTROL ALPHA= -4.5 DEG  
 TIP MAX-MACH= .83 DELTA PSI= -2.4 DEG  
 TIP MIN-MACH= .51 .9R MAX-MACH= .77 ENGINE POWER= 398. KW = 533. HP  
 .9R MIN-MACH= .44 THRUST FACTOR= .784E+07 N = .176E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .239	TOTAL CQ= .000220	AMB TEMP= 11.8 C = 53.27 F		
RUN NO.	V= 106.5 KT	MAST CQ= .000202	TEMP U60= 31.5 C = 88.75 F		
	NZ= 1.202 G	OMEGA= 34.212 RAD/SEC	CAN TEMP= 23.8 C = 74.81 F		
TIME101100.65	CLP= .00512	RPM/324= 1.008			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 8.1	A1= -.3	B1= 3.6	PEAK-TO-PEAK= 7.4
	TEETER ANG (DEG)	A0= .1	A1= -.3	B1= .1	PEAK-TO-PEAK= .7
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N-DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	45004.	-57.	-3502.	-2270.	-429.
HARMONIC-1	2850./ -9.1	530./ -19.5	110./ -34.9	1838./ -38.9	293./ -54.6
2	357./ 1.4	166./ -30.1	14./ 57.4	1270./ -55.1	117./ -50.1
3	1738./ 45.1	434./ 49.3	66./ 55.4	174./ 29.5	34./ 50.6
4	387./ 58.6	227./ 40.2	105./ 24.0	301./ 74.1	56./ 44.2
5	623./ -53.9	148./ -60.2	32./ -43.4	132./ -54.4	16./ 38.5
6	1335./ -14.5	740./ -20.4	225./ -18.4	91./ ?7.8	29./ 35.1
7	189./ 55.5	149./ 87.9	42./ -83.1	66./ 26.8	14./ 43.1
8	173./ 48.6	109./ 75.0	36./ 73.7	36./ -56.2	9./ 67.6
9	74./ -69.2	129./ 43.5	57./ 45.3	38./ 52.3	5./ 75.4
10	101./ -2.9	79./ 55.4	38./ 68.5	57./ 44.4	4./ 26.4
11	108./ -6.3	31./ -21.3	18./ -57.6	62./ RR.0	6./ -6.3
12	164./ -28.1	78./ -50.1	50./ -57.7	17./ -77.7	8./ -76.6
PEAK-TO-PEAK	10483.	3541.	951.	5376.	715.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DFG)	BEAM .803 (N-M/DEG)
MEAN	-1869.	-139.	-210.	-481.	-532.
HARMONIC-1	458./ -50.3	347./ -69.5	367./ -69.8	385./ -70.7	199./ -86.2
2	257./ -66.1	218./ -79.7	244./ -76.4	209./ -76.6	82./ -80.1
3	49./ 31.8	61./ 26.2	55./ 45.0	52./ 82.1	62./ 77.1
4	264./ 47.8	93./ 37.5	54./ 31.8	65./ 45.9	115./ 27.7
5	113./ -67.1	15./ -70.3	7./ 58.1	18./ -62.1	43./ 88.7
6	88./ -79.4	10./ -5.1	9./ -76.1	16./ 17.7	22./ -61.9
7	27./ -64.2	6./ 56.0	10./ 53.1	9./ -3.4	25./ -60.1
8	35./ 33.9	4./ 80.0	12./ 23.8	9./ -15.1	17./ -7.0
9	21./ 54.0	15./ 62.4	5./ -85.8	16./ 89.4	17./ -74.3
10	37./ 28.8	16./ 29.5	16./ 9.9	23./ 17.5	17./ 2.3
11	9./ -85.3	9./ -61.6	6./ 15.4	2./ 7.8	4./ 87.9
12	21./ -86.3	8./ -86.4	5./ -79.2	5./ -38.7	3./ -4.5
PEAK-TO-PEAK	1775.	1091.	1160.	1129.	722.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 084 AIRCRAFT TOTAL WT = 33715. N LOADED CG X= 5.03 M = 198.1 IN  
 RUN NO. 10 7580. LB Y= -.00 = -.0  
 TIME \*\*\*\*\* (SEC) Z= 1.85 = 72.9

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.70 KPA = 35.5 PSF  
 STATIC PRES= 87.0 KPA = 1818. PSF  
 T. AIRSPEED= 109.6 KT TOTAL TEMP= 286.8 DEG K = 516.3 DEG R  
 A/C MACH NO= .166 STATIC TEMP= 285.2 DEG K = 513.4 DEG R  
 BODY ALPHA= 2.1 DEG DENSITY= 1.06 KG/M3 = .00206 SLUG/FT3  
 BODY BETA= 5.5 DEG DENSITY ALT= 1451. M = 4761. FT  
 SONIC SPEED= 339.1 M/SEC = 1113. FPS  
 RATE OF CLIMB= -282. M/MIN = -924. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (G)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC2)		
X	56.10	184.1	-0.083	55.81	183.1	-0.078	ROLL	.0	-.003	.060
Y	5.42	17.8	-.056	5.41	17.7	-.044	PITCH	-2.7	.144	-.026
Z	2.06	6.8	-1.519	2.07	6.8	-1.515	YAW	362.1	.017	.008

CONTROL ANGLES M.R. COLL= 10.1 DEG HORIZ FIN= 7.1 DEG  
 A1= .8 DEG T.R. COLL= 2.3 DEG  
 B1= 2.7 DEG PEDAL POS= 2.8 DEG

ROTOR PARAMETERS SHAFT ALPHA= 2.1 DEG  
 HOVER TIP MACH=.68 CONTROL ALPHA= -.6 DEG  
 TIP MAX-MACH=.84 DELTA PSI= -5.5 DEG  
 TIP MIN-MACH=.51  
 .9R MAX-MACH=.78 ENGINE POWER= 364. KW = 488. HP  
 .9R MIN-MACH=.44 THRUST FACTOR= .792E+07 N = .178E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO. 84	MU= .244	TOTAL CQ= .000197	AMB TEMP= 12.1 C = 53.73 F		
RUN NO. 10	V= 109.6 KT	MAST CQ= .000171	TFMP U60= 31.2 C = 88.12 F		
	NZ= 1.515 G	OMEGA= 34.493 RAD/SEC	CAN TEMP= 23.8 C = 74.81 F		
TIME101143.60	CLP= .00637	RPM/324= 1.017			
ROTOR ANGLES	THETA 3/4 (DEG) TETHER ANG (DEG)	A0= 7.9 A0= .1	A1= -.0 A1= -.3	B1= 3.2 B1= .5	PEAK-TO-PEAK= 6.7 PEAK-TO-PEAK= 1.4
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N/DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LNK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	47298.	-229.	-3559.	-1998.	-420.
HARMONIC-1	4940./ -4.2	1013./ -2.1	206./ -8.9	1737./ -36.1	270./ -60.1
2	319./ 22.9	205./ -34.0	37./ 75.7	1109./ -50.4	104./ -30.1
3	2148./ 15.2	514./ 22.1	80./ 33.1	333./ 10.9	43./ 31.5
4	301./ 54.0	250./ 26.2	134./ 7.5	403./ 63.0	79./ 26.2
5	606./ -51.3	97./ -76.1	19./ 8.0	141./ -5.4	40./ 64.2
6	1291./ -63.6	815./ -65.3	241./ -67.0	310./ 19.7	59./ 9.3
7	250./ -65.2	114./ -18.2	43./ -30.3	169./ -8.6	25./ 10.8
8	33./ 73.3	88./ 67.6	36./ 49.9	61./ 66.3	14./ 28.2
9	89./ 33.0	48./ -58.0	14./ -88.2	83./ 58.8	6./ -64.2
10	39./ 45.3	90./ -83.9	42./ 88.3	82./ -47.7	14./ -81.2
11	89./ -26.7	17./ 33.0	30./ 59.4	31./ 63.5	5./ -18.2
12	152./ 46.0	53./ 74.6	21./ 64.2	14./ -67.4	10./ 23.9
PEAK-TO-PEAK	12138.	4439.	1302.	5626.	716.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1563.	-114.	-220.	-538.	-632.
HARMONIC-1	521./ -32.5	392./ -69.6	413./ -73.7	425./ -78.5	259./ 81.2
2	260./ -63.0	224./ -84.6	257./ -81.3	236./ -82.5	106./ 82.6
3	133./ -23.4	76./ -13.3	53./ 11.2	55./ 50.1	72./ 56.1
4	428./ 32.0	133./ 17.0	62./ 22.0	102./ 25.4	171./ 16.6
5	149./ -50.1	27./ -64.2	22./ 26.8	35./ -50.4	51./ 70.9
6	99./ -83.7	14./ 1.3	16./ -36.8	10./ 34.8	33./ 63.2
7	85./ -4.1	25./ 4.8	44./ 10.3	7./ 69.4	59./ 48.8
8	14./ -65.1	6./ 71.3	3./ -16.0	11./ 63.6	21./ 63.5
9	35./ 46.8	29./ 59.3	13./ 24.8	33./ 61.2	29./ 67.7
10	39./ -58.8	21./ -57.9	7./ -76.7	23./ -57.7	19./ -66.3
11	5./ 18.6	4./ -24.2	2./ -23.2	8./ 9.8	11./ 31.9
12	35./ 50.8	7./ 40.2	9./ 45.0	6./ -90.0	5./ -24.4
PEAK-TO-PEAK	2557.	1262.	1292.	1310.	1003.

## NASA Langley Flight Data AH-1G ---- PADS PCM DATA

FLIGHT NO. 084 AIRCRAFT TOTAL WT = 33227. N  
 RUN NO. 24 7470. LB LOADED CG X= 5.03 M = 198.1 IN  
 TIME \*\*\*\*\* (SEC) Y= -.00 = -.0  
 Z= 1.86 = 73.2

AERODYNAMIC FLIGHT STATE DYNAMIC PRES= 1.73 KPA = 36.2 PSF  
 STATIC PRES= 87.8 KPA = 1834. PSF  
 T. AIRSPEED= 110.3 KT TOTAL TEMP= 287.1 DEG K = 516.9 DEG R  
 A/C MACH NO= .167 STATIC TEMP= 285.5 DEG K = 514.0 DEG R  
 BODY ALPHA= 3.5 DEG DENSITY= 1.07 KG/M3 = .00208 SLUG/FT3  
 BODY BETA= .5 DEG DENSITY ALT= 1375. M = 4510. FT  
 SONIC SPEED= 339.3 M/SEC = 1113. FPS  
 RATE OF CLIMB= -406. M/MIN = -1334. FPM

## INERTIAL FLIGHT STATE

AXIS	CG LIN VEL (M/S)	CG LIN ACC (G)	HUB LIN VEL (M/S)	HUB LIN ACC (FPS)	AXIS	ANG POS (DEG)	ANG RATES (RAD/SEC)	ANG ACC (RAD/SEC 2)
X	56.64	185.8	-0.090	56.33	ROLL	-43.3	-.028	.090
Y	.46	1.5	-.008	.41	PITCH	-4.6	.151	.003
Z	3.48	11.4	-1.557	3.49	11.4	-1.552	251.8	-.129

CONTROL ANGLES M.R. COLL= 9.7 DEG HORIZ FIN= 7.1 DEG  
 A1= .6 DEG T.R. COLL= 2.2 DEG  
 B1= 2.7 DEG PEDAL POS= 3.3 DEG

ROTOR PARAMETERS SHAFT ALPHA= 3.5 DEG  
 HOVER TIP MACH= .68 CONTROL ALPHA= .8 DEG  
 TIP MAX-MACH= .85 DELTA PSI= -.4 DEG  
 TIP MIN-MACH= .51  
 .9R MAX-MACH= .78 ENGINE POWER= 312. KW = 418. HP  
 .9R MIN-MACH= .45 THRUST FACTOR= .807E+07 N = .181E+07 LB

## NASA Langley Flight Data AH-1G ---- ROTOR PERFORMANCE AND LOADS

FLIGHT NO.	MU= .245	TOTAL CQ= .000166	AMB TEMP= 12.4 C = 54.31 F		
RUN NO.	V= 110.3 KT	MAST CQ= .000143	TEMP U60= 30.5 C = 86.87 F		
TIME	NZ= 1.552 G	OMEGA= 34.523 RAD/SEC	CAN TEMP= 21.5 C = 70.62 F		
	CLP= .00637	RPM/324= 1.018			
ROTOR ANGLES	THETA 3/4 (DEG)	A0= 7.8	A1= -.5	B1= 3.1	PEAK-TO-PEAK= 6.3
	TEETER ANG (DEG)	A0= .1	A1= -.3	B1= .8	PEAK-TO-PEAK= 1.6
ROTOR LOADS (AMP/PHASE)	DRAG BRACE (N-DEG)	CHORD .449 (N-M/DEG)	CHORD .803 (N-M/DEG)	PITCH LINK (N/DEG)	TORSION .449 (N-M/DEG)
MEAN	48497.	-130.	-3469.	-1999.	-420.
HARMONIC-1	5800./ 2.4	1170./ 2.1	252./ -4.9	1807./ -23.4	269./ -49.2
2	591./ 62.1	205./ 8.3	25./ -73.1	1080./ -30.9	97./ -9.6
3	2031./ 38.3	444./ 43.6	67./ 60.3	325./ 37.6	49./ 57.8
4	379./ 68.5	292./ 49.7	151./ 31.9	362./ -76.6	71./ 52.9
5	614./ -11.1	100./ -17.5	26./ 31.4	175./ 41.2	51./ -78.2
6	1013./ -7.8	638./ -12.8	180./ -13.0	271./ 69.9	54./ 61.7
7	268./ 1.3	140./ 38.9	48./ 26.3	141./ 52.4	24./ 73.0
8	80./ -75.0	59./ -60.0	17./ -83.6	44./ -50.0	13./ -85.9
9	39./ -31.8	81./ 3.6	30./ 4.1	61./ -53.2	5./ 19.3
10	85./ 55.8	142./ -35.5	80./ -52.1	90./ 13.0	16./ -11.7
11	65./ -3.6	11./ 47.0	15./ -44.2	35./ -12.7	12./ 69.2
12	27./ 86.0	11./ -80.2	13./ 27.7	1./ -70.3	6./ -43.7
PEAK-TO-PEAK	12859.	3926.	1073.	5241.	713.
	BEAM .174 (N-M/DEG)	BEAM .350 (N-M/DEG)	BEAM .449 (N-M/DEG)	BEAM .606 (N-M/DEG)	BEAM .803 (N-M/DEG)
MEAN	-1626.	-128.	-222.	-537.	-635.
HARMONIC-1	578./ -18.9	393./ -59.0	420./ -63.1	421./ -69.2	256./ 86.1
2	264./ -44.7	212./ -67.0	240./ -65.0	227./ -66.4	97./ -78.8
3	113./ .9	67./ 9.8	57./ 43.1	66./ 79.0	80./ 85.3
4	374./ 60.9	123./ 45.2	62./ 52.1	88./ 52.7	161./ 42.6
5	162./ -8.9	29./ -27.9	26./ 72.8	37./ -11.0	56./ -74.5
6	82./ -31.4	14./ 86.4	15./ 72.6	10./ -74.3	42./ -64.3
7	62./ 60.4	21./ 64.9	39./ 85.0	9./ -49.4	58./ -64.7
8	16./ -10.1	3./ -24.1	5./ 89.3	10./ -52.4	19./ -45.8
9	27./ -76.4	23./ -44.7	9./ 80.8	26./ -33.6	26./ -23.0
10	44./ 13.7	21./ 23.4	9./ 18.4	28./ 26.5	24./ 22.7
11	9./ -22.9	5./ -85.6	1./ 22.1	6./ -59.7	9./ -34.5
12	26./ -25.2	6./ -26.8	12./ -39.2	8./ -.7	3./ 54.4
PEAK-TO-PEAK	2444.	1242.	1237.	1260.	984.

## REFERENCES

1. Dadone, Leo: Rotor Airfoil Optimization: An Understanding of the Physical Limits. Paper No. 78-04, Am. Helicopter Soc., May 1978.
2. Morris, Charles E. K., Jr.: Rotor-Airfoil Flight Investigation: Preliminary Results. Paper No. 78-05, Am. Helicopter Soc., May 1978.
3. Morris, Charles E. K., Jr.; Tomaine, Robert L.; and Stevens, Dariene D.: A Flight Investigation of Performance and Loads for a Helicopter with NLR-1T Main-Rotor Blade Sections. NASA TM 80165, 1979.
4. Morris, Charles E. K., Jr.; Stevens, Dariene D.; and Tomaine, Robert L.: A Flight Investigation of Blade-Section Aerodynamics for a Helicopter Main-Rotor Having NLR-1T Airfoil Sections. NASA TM 80166 (AVRADCOM TM 80-B-1), 1980.
5. Morris, Charles E. K., Jr.: A Flight Investigation of Basic Performance Characteristics of a Teetering-Rotor Attack Helicopter. NASA TM 80112, 1979.
6. Bingham, Gene J.; and Noonan, Kevin W.: Experimental Investigation of Three Helicopter Rotor Airfoils Designed Analytically. NASA TP 1396 (AVRADCOM TR 79-11), 1979.
7. Knight, Vernie H.; Haywood, William S., Jr.; and Williams, Milton L.: A Rotor-Mounted Digital Instrumentation System for Helicopter Blade Flight Research Measurements. NASA TP 1146, 1978.
8. Bingham, Gene J.: An Analytical Evaluation of Airfoil Sections for Helicopter Rotor Applications. NASA TN D-7796, 1975.

TABLE I.- BASIC AIRCRAFT CHARACTERISTICS

Empty weight, N (lb.) . . . . .	28,160 (6330)
Fuel capacity, N (lb.) . . . . .	7,250 (1630)
Powerplant . . . . .	Lycoming T53-L-13B
Nominal transmission limit at 100% rpm, kw (hp) . . . . .	820 (1100)

Wing:

Airfoil	
Root . . . . .	NACA 0030
Tip . . . . .	NACA 0024
Semi-span (panel only), m (ft) . . . . .	1.09 (3.56)
Area (panels only), m <sup>2</sup> (ft <sup>2</sup> ) . . . . .	1.63 (17.6)
Chord:	
Root, m (ft) . . . . .	0.88 (2.89)
Tip, m (ft) . . . . .	0.62 (2.04)
Incidence angle (chord line), deg . . . . .	14.0
Leading-edge sweep, deg . . . . .	15.2
Dihedral angle, deg . . . . .	0.0

Horizontal tail:

Airfoil . . . . .	inverted Clark Y
Semi-span (panel only), m (ft) . . . . .	0.78 (2.54)
Area (panels only), m <sup>2</sup> (ft <sup>2</sup> ) . . . . .	0.95 (10.2)
Chord:	
Root, m (ft) . . . . .	0.75 (2.45)
Tip, m (ft) . . . . .	0.54 (1.78)
Leading-edge sweep, deg . . . . .	19.9
Dihedral angle, deg . . . . .	0.0

Vertical tail:

Airfoil	
Root . . . . .	cambered, 14% thick
Tip . . . . .	cambered, 15% thick
Span (above tail boom), m (ft) . . . . .	1.64 (5.38)
Area, m <sup>2</sup> (ft <sup>2</sup> ) . . . . .	1.73 (18.6)
Chord:	
Root, m (ft) . . . . .	1.42 (4.67)
Tip, m (ft) . . . . .	69 (2.25)
Leading-edge sweep, deg . . . . .	50.0
Twist, deg . . . . .	nonlinear

TABLE I.- Concluded

## Main rotor:

Number of blades . . . . .	2
Airfoil . . . . .	10-64C
Radius (R), m (ft) . . . . .	6.706 (22.0)
Chord, m (ft) . . . . .	0.686 (2.25)
Taper . . . . .	1:1
Solidity . . . . .	0.0651
Twist, deg . . . . .	-10/R
Flapwise inertia, kg-m <sup>2</sup> (slug-ft <sup>2</sup> ) . . . . .	2120 (1560)
Lock number . . . . .	5.05
Nominal tip speed, m/sec (ft/sec) . . . . .	227.5 (746.6)
Hub precone angle, deg . . . . .	2.75
Pitch-flap coupling, deg . . . . .	0.0
Blade pitch range at 0.75 R, deg . . . . .	-11.9, +39.2
Trim tab -	
Width, m (ft) . . . . .	0.191 (0.75)
Overhang length, m (ft) . . . . .	0.042 (0.138)
In-board edge . . . . .	0.761 R
Blade weight, kN (lb)* . . . . .	1.267 (284.9), 1.263 (284.0)
Blade static center of gravity	
Chordwise, c . . . . .	.246, .245
Spanwise, R . . . . .	.5409, .5333
Blade measured torsional natural frequency, Hz* . . . . .	16.7, 17.0

## Tail rotor:

Number of blades . . . . .	2
Airfoil	
0.25 tail-rotor radius . . . . .	NACA 0018
Tip . . . . .	cambered, 8% thick
Radius . . . . .	1.295 (4.25)
Chord, m (ft) . . . . .	0.292 (0.96)
Taper . . . . .	1:1
Solidity . . . . .	0.144
Twist, deg . . . . .	0.0
Equivalent root cut-out . . . . .	35
Nominal tip speed, m/sec (ft/sec) . . . . .	227.5 (746.4)
Blade pitch range, deg <sup>3</sup> . . . . .	-14.7, +15.3
Hub precone angle, deg . . . . .	1°
Pitch-flap coupling, deg . . . . .	30°

\*Characteristics given for instrumented and uninstrumented blade,  
respectively

TABLE II. - COORDINATES OF 10-64C AIRFOIL

x/c	y <sub>u</sub> /c	x/c	y <sub>1</sub> /c
0.00000	0.00000	0.00000	0.00000
.00631	.01182	.00613	-.00908
.01228	.01659	.01295	-.01344
.01981	.02070	.01997	-.01640
.02913	.02441	.02883	-.01897
.04072	.02819	.04054	-.02170
.05471	.03202	.05575	-.02450
.09059	.03943	.09220	-.02884
.14814	.04765	.15286	-.03323
.20098	.05278	.20283	-.03561
.25089	.05615	.25015	-.03732
.30780	.05859	.30429	-.03877
.35507	.05960	.34940	-.03959
.40614	.05970	.41539	-.04014
.46074	.05873	.46898	-.03995
.51845	.05654	.52565	-.03908
.57867	.05307	.58482	-.03738
.64055	.04837	.64568	-.03473
.70302	.04253	.70715	-.03110
.76468	.03574	.76787	-.02658
.82383	.02829	.82615	-.02139
.87842	.02063	.87998	-.01586
.92603	.01335	.92696	-.01045
.96382	.00719	.96433	-.00579
.98896	.00293	.98909	-.00251
1.00000	.00100	1.00000	-.00100

TABLE III.- PADS-PCM DATA SYSTEM CHARACTERISTICS

Parameter	System Accuracy (a)	Digital Channel Precision	Filter Frequency (b)
Aerodynamic Flight State:			
dynamic pressure - regular	70 Pa	14 Pa	1 Hz
- sensitive	14 Pa	3 Pa	_____
static pressure - regular	500 Pa	200 Pa	_____
- sensitive	70 Pa	40 Pa	_____
angle of attack	.1°	.18°	10 Hz
angle of sideslip	.1°	.18°	10 Hz
total temperature	.06°C	.1°C	_____
Inertial Flight State:			
roll attitude	.5°	.36°	_____
pitch attitude	.5°	.18°	_____
heading	3.0°	.72°	_____
angular rates	.01 rad/sec	.044 rad/sec	10 Hz
longitudinal acceleration	.001 g	.004 g	10 Hz
lateral acceleration	.001 g	.003 g	10 Hz
normal acceleration	.005 g	.009 g	10 Hz
Control Positions:			
lateral servo	.1°	.04°	10 Hz
longitudinal servo	.1°	.07°	10 Hz
collective servo	.1°	.05°	10 Hz
horizontal fin	.1°	.02°	10 Hz
pedal position	.16°	.07°	10 Hz
tail-rotor collective	.1°	.07°	10 Hz
Rotor/Engine Parameters:			
main-rotor speed - regular	.5%	.23%	_____
- sensitive	.1%	.05%	_____
main-rotor azimuth	1°	22.5°	_____
engine torque pressure	3 kPa	1.3 kPa	_____
fuel quantity	60	40	_____

Notes: (a) accuracy of analog signal before digitization

(b) frequency at 3 db roll-off for constant delay, 4 pole Bessel Filters

TABLE IV.- CHARACTERISTICS OF ROTOR-DATA SENSORS AND CHANNELS

Parameter	Analog system accuracy	Digital channel precision	Maximum final-data error	Data reduction parameters (b)			
				$m_1$ (1/mV)	$\Delta m_2 \times 10^5$ (mV/count-C)	$\Delta V_o$ (mV/C)	$\Delta P_o$ (N-m/C)
$\beta_s$	.1°	.11°	.3°	.102°	13.4	-.009	—
$\theta_s$	.1°	.25°	.8°	.45°	14.0	-.006	—
$\Psi$	—	1.41°	.3°	—	—	—	—
$F_{db}$	70 N	546. N	1.4 kN	-5430.0 N	9.2	-.016	—
$F_{p1}$	36 N	123.4 N	.31 kN	1244. N-m	7.8	-.009	—
$M_{b17}$	—	24.6 N-m	.06 kN-m	353. N-m	9.5	-.011	-11.6
$M_{b35}$	—	26.7 N-m	.07 kN-m	351. N-m	12.6	-.009	-13.4
$M_{b45}$	—	26.7 N-m	.07 kN-m	215. N-m	10.3	-.012	-9.2
$M_{b61}$	—	20.3 N-m	.05 kN-m	203. N-m	7.1	-.008	-7.1
$M_{b80}$	—	18.3 N-m	.05 kN-m	117. N-m	12.0	-.018	-23.6
$M_{c45}$	—	134.2 N-m	.34 kN-m	1790. N-m	6.0	-.005	1.8
$M_{c80}$	—	40.7 N-m	.10 kN-m	1250. N-m	2.7	-.003	87.3
$M_{t45}$	—	15.2 N-m	.04 kN-m	303. N-m	3.9	-.004	0.4
$Q$	112 N-m	124. N-m	.32 kN-m	620. N-m	16.9	-.024	—
$T_b$	—	.4°C	1.0°C	—	—	—	—
$T_{ce}$	—	.4°C	1.0°C	—	—	—	—

Notes: (a) conservative accuracy bound for absolute value of single digital-data value  
 (b) constants used in the data-reduction equations of reference 7

$$\Delta f = (m_1 (\Delta m_2 \delta + \Delta V_o)) \Delta T_{ce} + \Delta P_o \Delta T_b$$

TABLE V.- TEST POINT/TEST CONDITION CATALOG

Flight condition	Test Point (Flight no.-run no.)	$\mu$	V (knots)	$C_L'$
Hover	77-2 78-2 79-41 80-2 82-35*	0 0 0 0 0	0 0 0 0 0	0.0042 0.0044 0.0037 0.0042 0.0037
Level flight	75-3 -4 -6 -8 -10 -12 -13 78-6 -10 -12 -13 -24 79-8 80-33 81-3 -4 -5 -6 -7 -8* -9 -10 -11 -12 -13*	0.150 .170 .211 .253 .294 .339 .363 .208 .291 .332 .359 .246 .239 .243 .147 .166 .184 .209 .227 .246 .268 .296 .314 .343 .371	67 76 93 112 130 150 161 92 128 148 159 109 106 108 65 74 82 92 101 109 119 131 140 152 162	0.0044 0.0045 0.0045 0.0044 0.0044 0.0043 0.0043 0.0043 0.0041 0.0042 0.0044 0.0040 0.0044 0.0050 0.0050 0.0051 0.0050 0.0051 0.0052 0.0051 0.0050 0.0051 0.0054
Climb	83-22 -24 -26	.244 .240 .244	107 107 108	0.0045 0.0045 0.0046
Descent	83-17 -23 -25	.242 .243 .236	109 108 108	0.0044 0.0045 0.0044
Right turn	78-27 -30 80-21 -23	.239 .240 .241 .239	107 110 107 107	0.0062 0.0078 0.0048 0.0066

\*Multiple data sets

TABLE V.- TEST POINT/TEST CONDITION CATALOG (Concluded)

Flight condition	Test Point (Flight no.-run no.)	$\mu$	V (knots)	$C_L'$
Left turn	78-37	.246	110	0.0051
	-39	.239	107	0.0057
	80-27	.242	106	0.0052
	-28	.244	108	0.0059
	-29	.241	108	0.0071
	-31	.245	111	0.0078
	84-24	.245	110	0.0064
Pull-up	78-8	.248	109	0.0043
	-20	.244	111	0.0086
	79-34	.241	108	0.0056
	80-19	.246	112	0.0078
	-38	.234	105	0.0072
	84-8	.239	107	0.0051
	-10	.244	110	0.0064

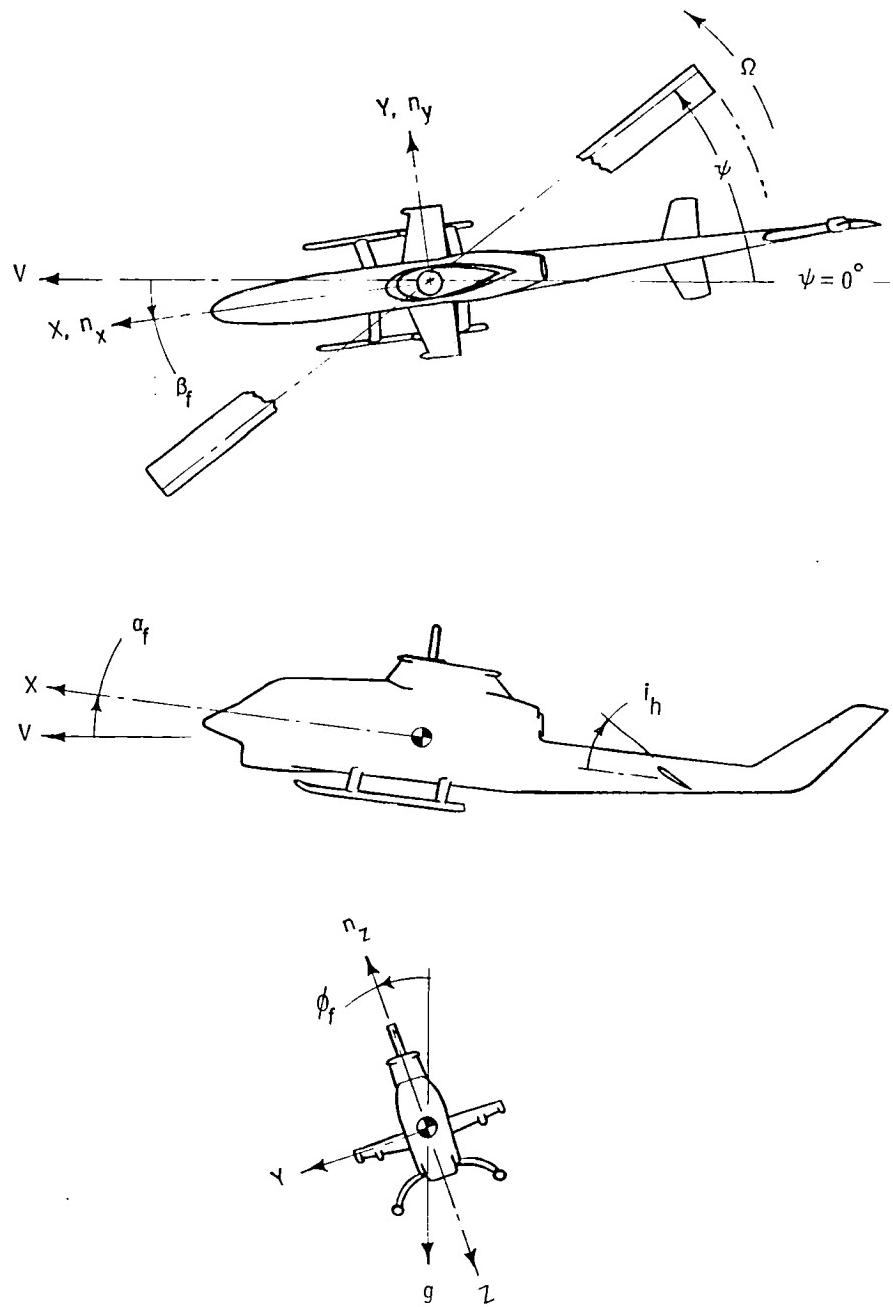


Figure 1. - Aircraft schematic and conventions used to define senses of axes, angles and accelerations.

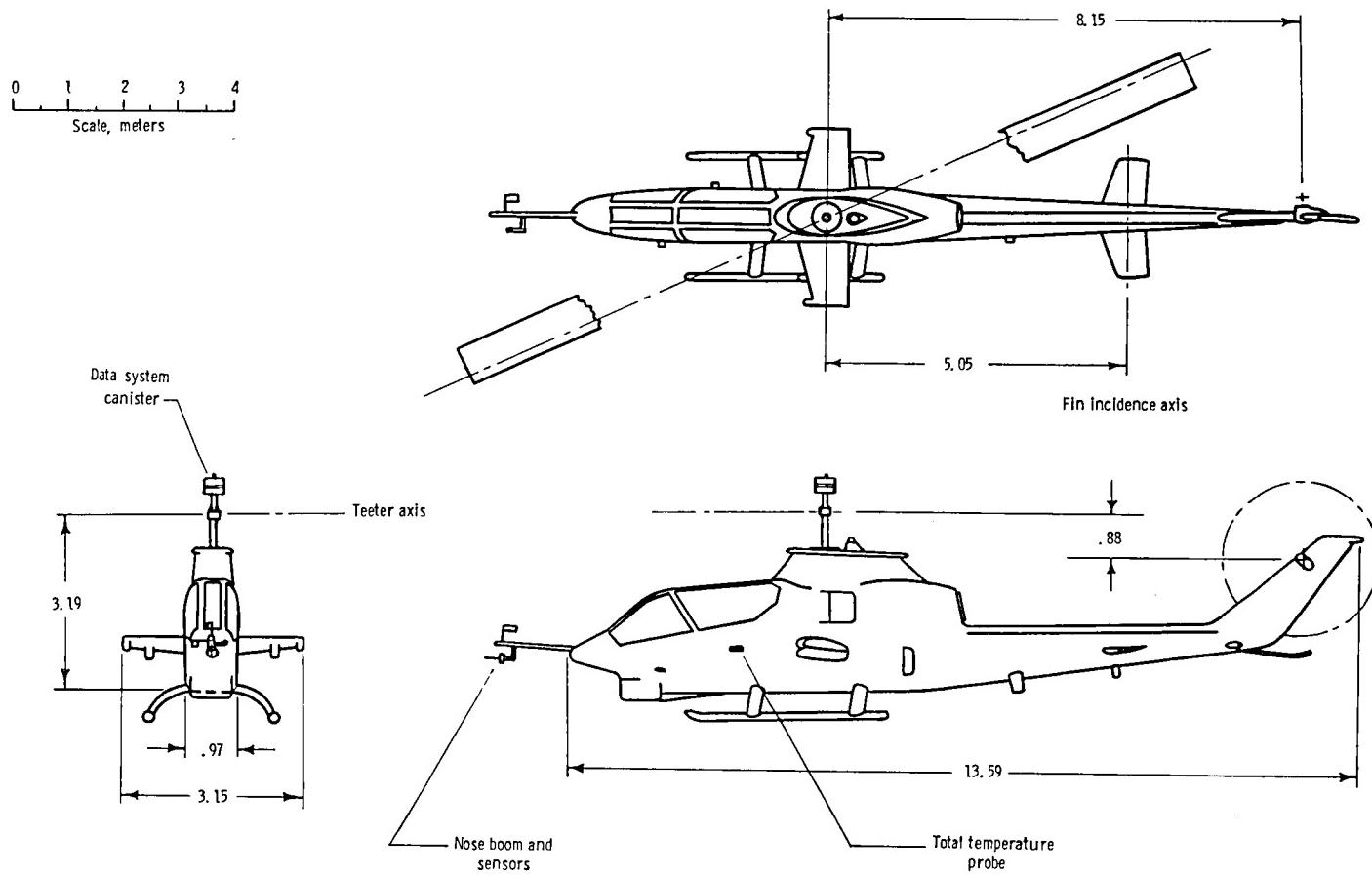


Figure 2. - Three-view scale drawing of aircraft. All dimensions are given in meters.

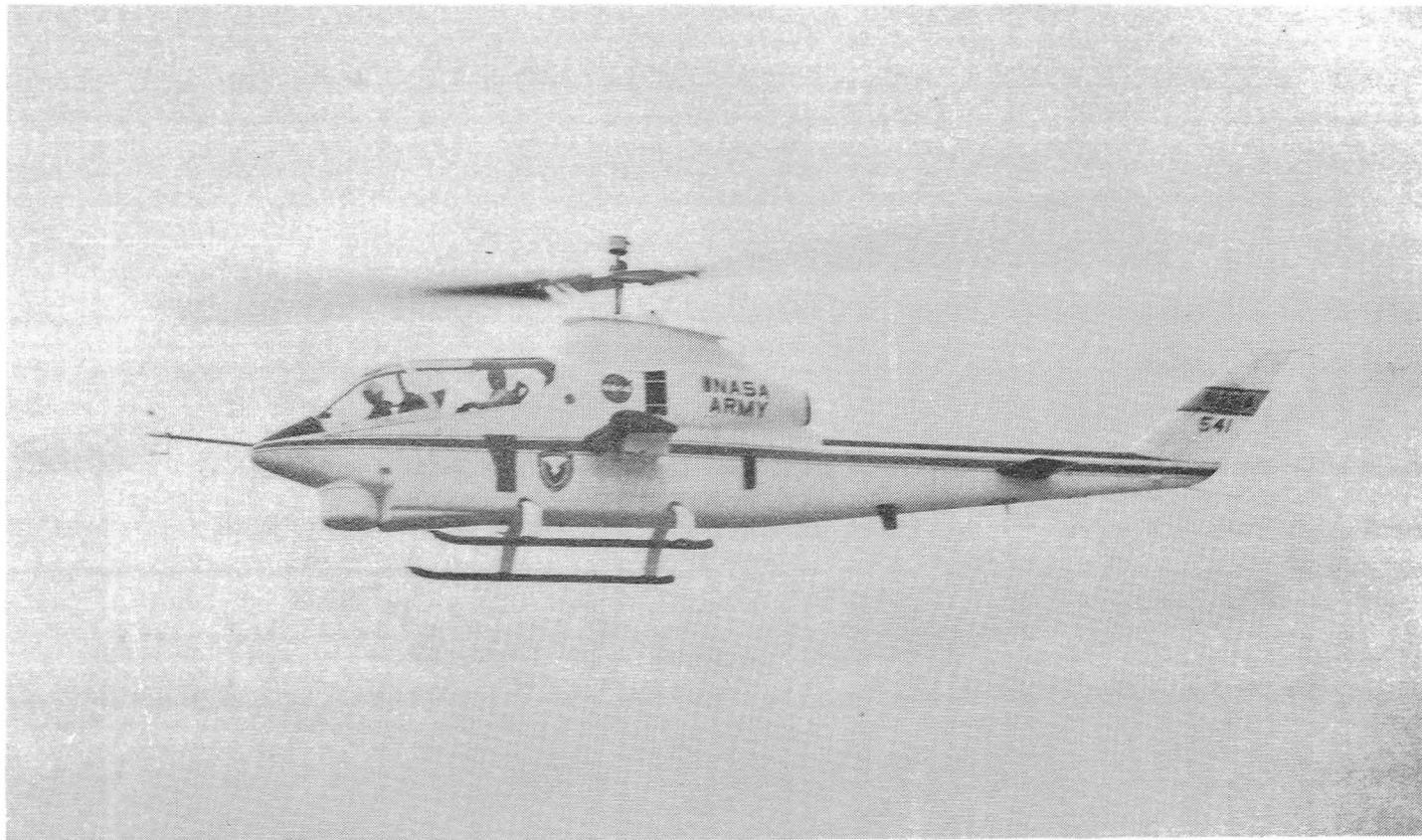


Figure 3. - Flight-test vehicle.

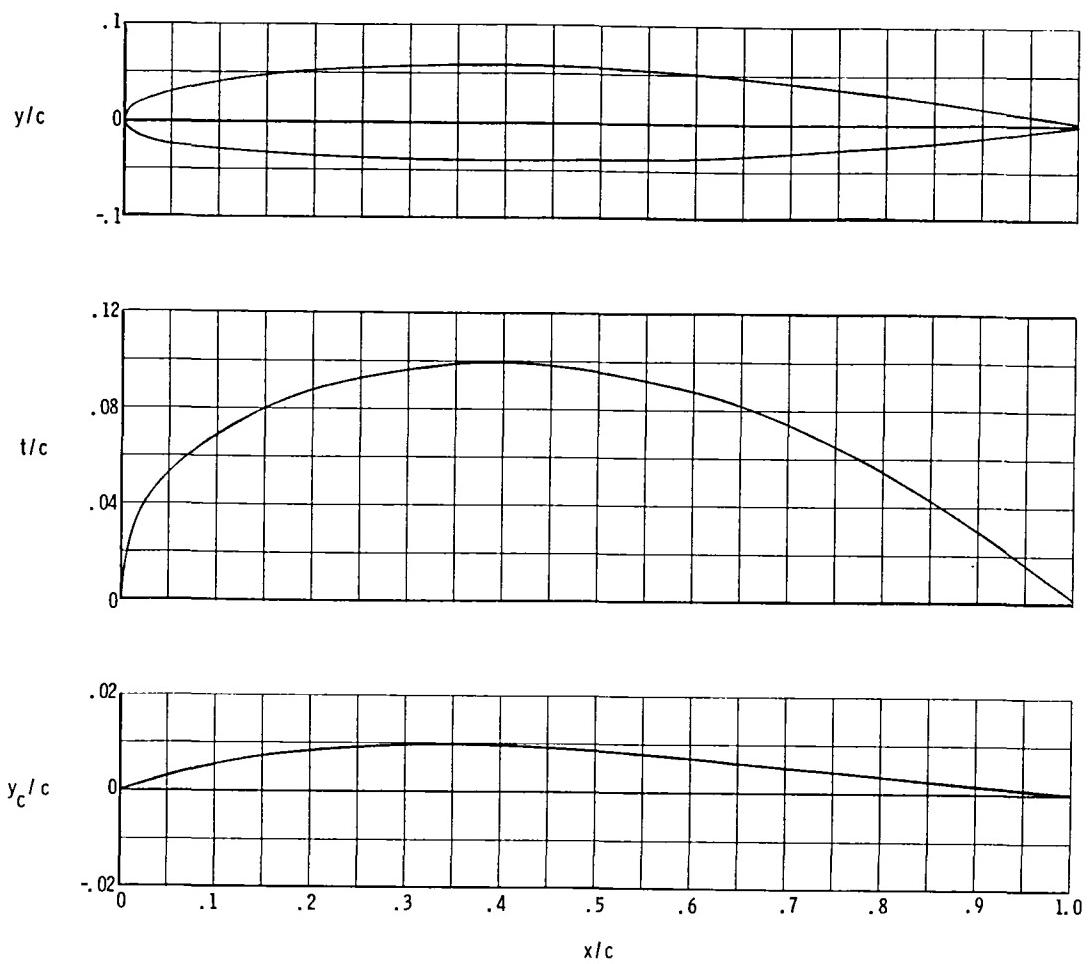


Figure 4. - Geometric characteristics of 10-64C airfoil.

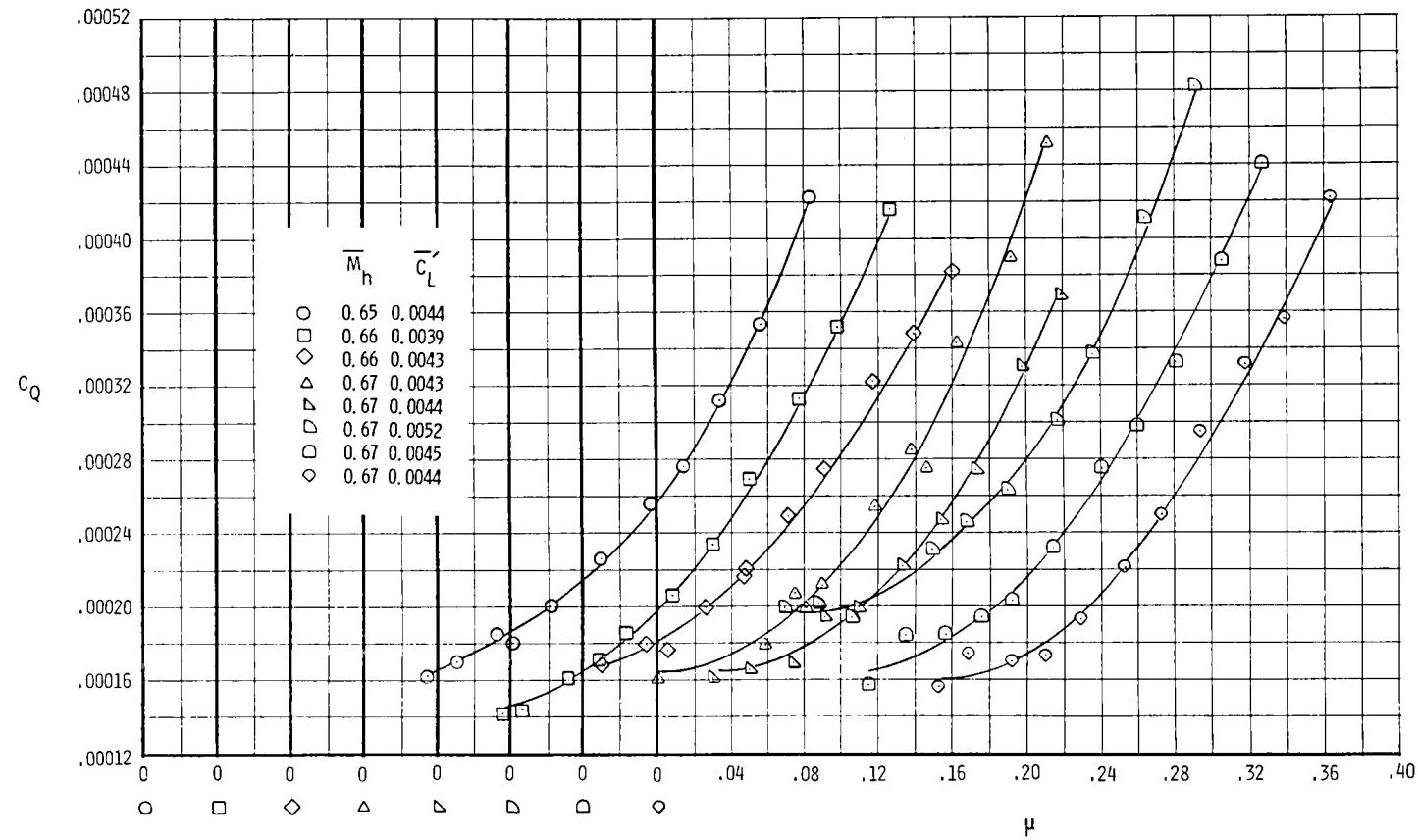
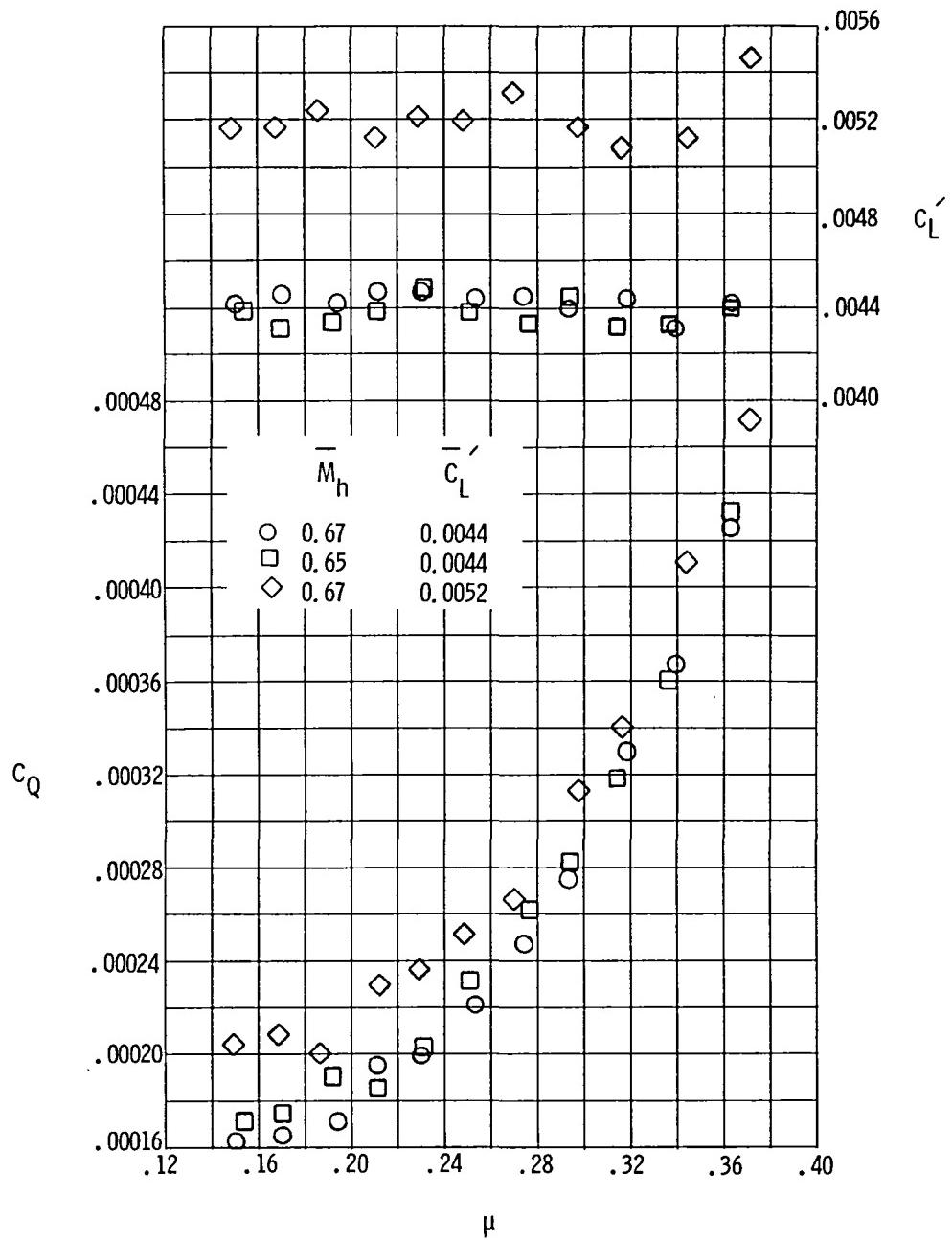
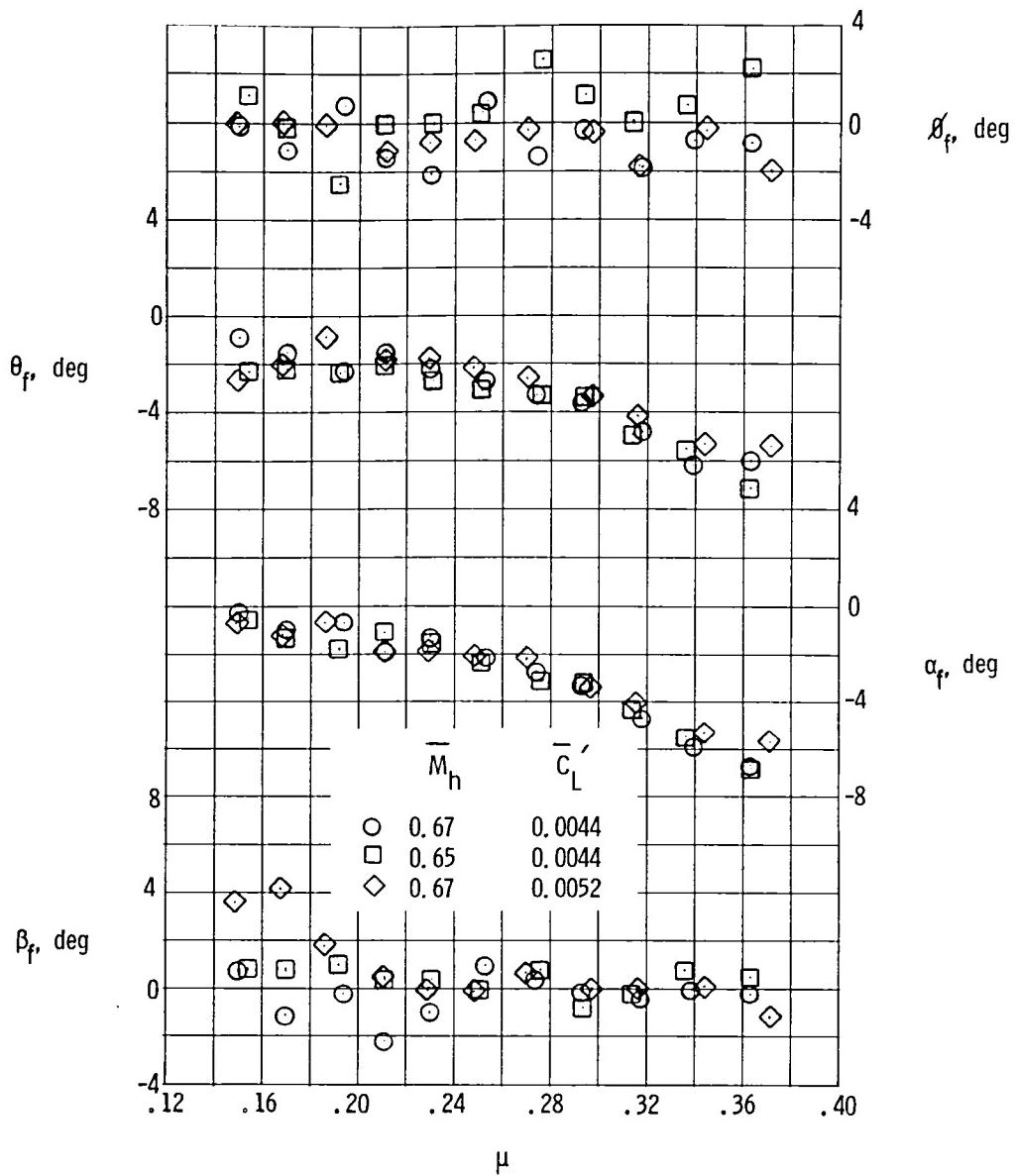


Figure 5.- Power (torque) coefficient as a function of tip-speed ratio for a series of test conditions.  
 $\Omega = 33.9 \text{ rad/sec. (324 rpm).}$



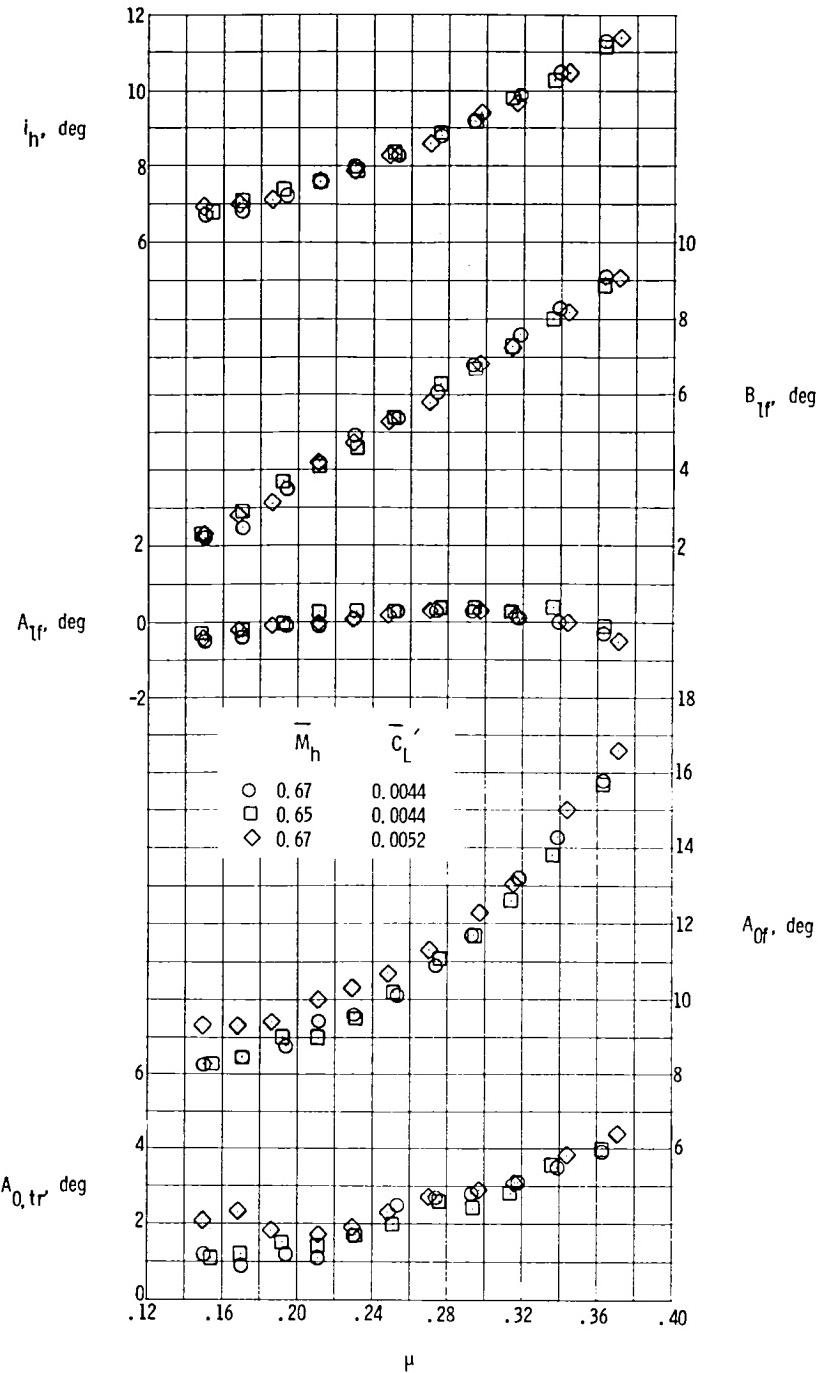
(a) Vehicle load and mast torque coefficients.

Figure 6. - Flight data for three level-flight speed sweeps.



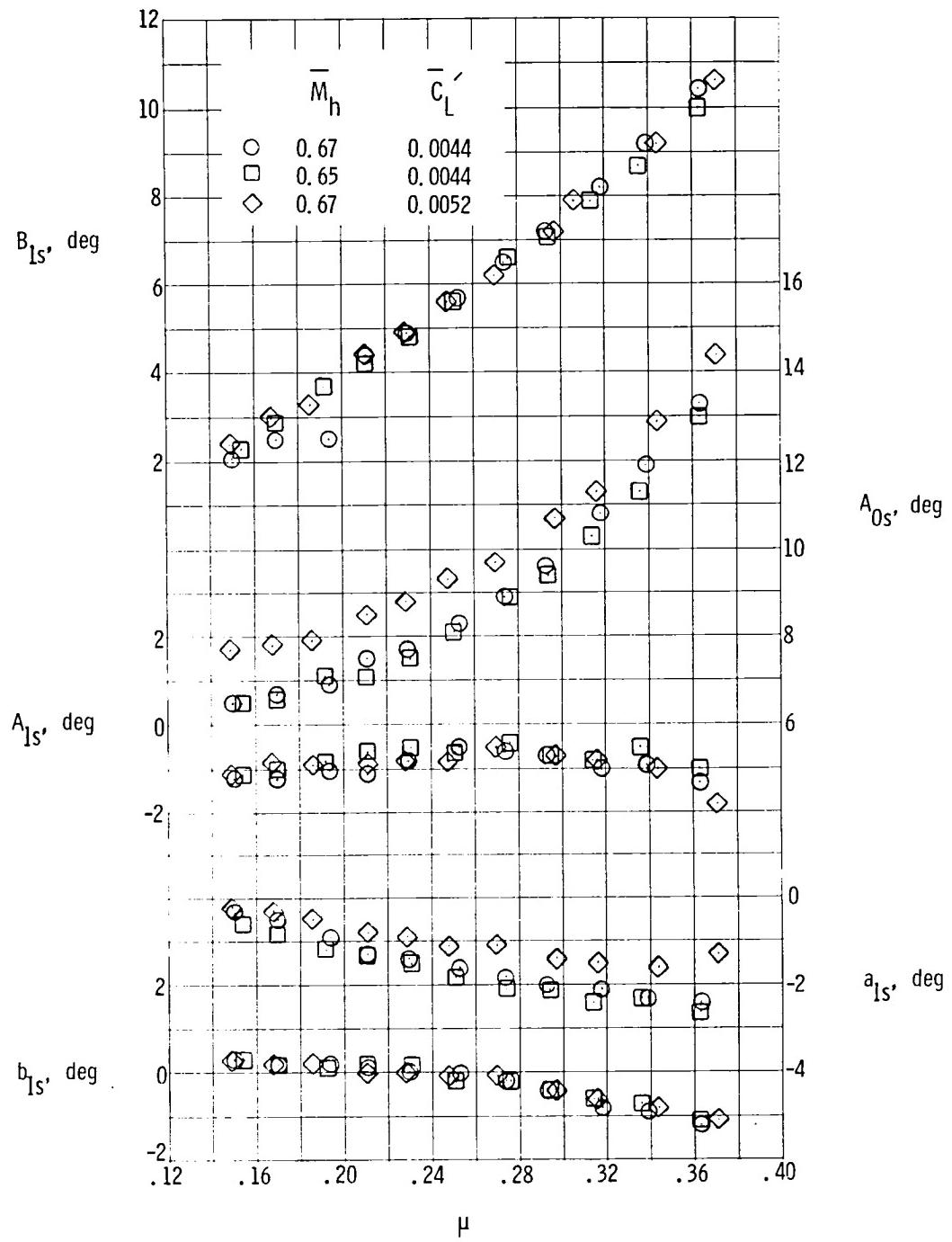
(b) Aircraft attitude.

Figure 6. - Continued.



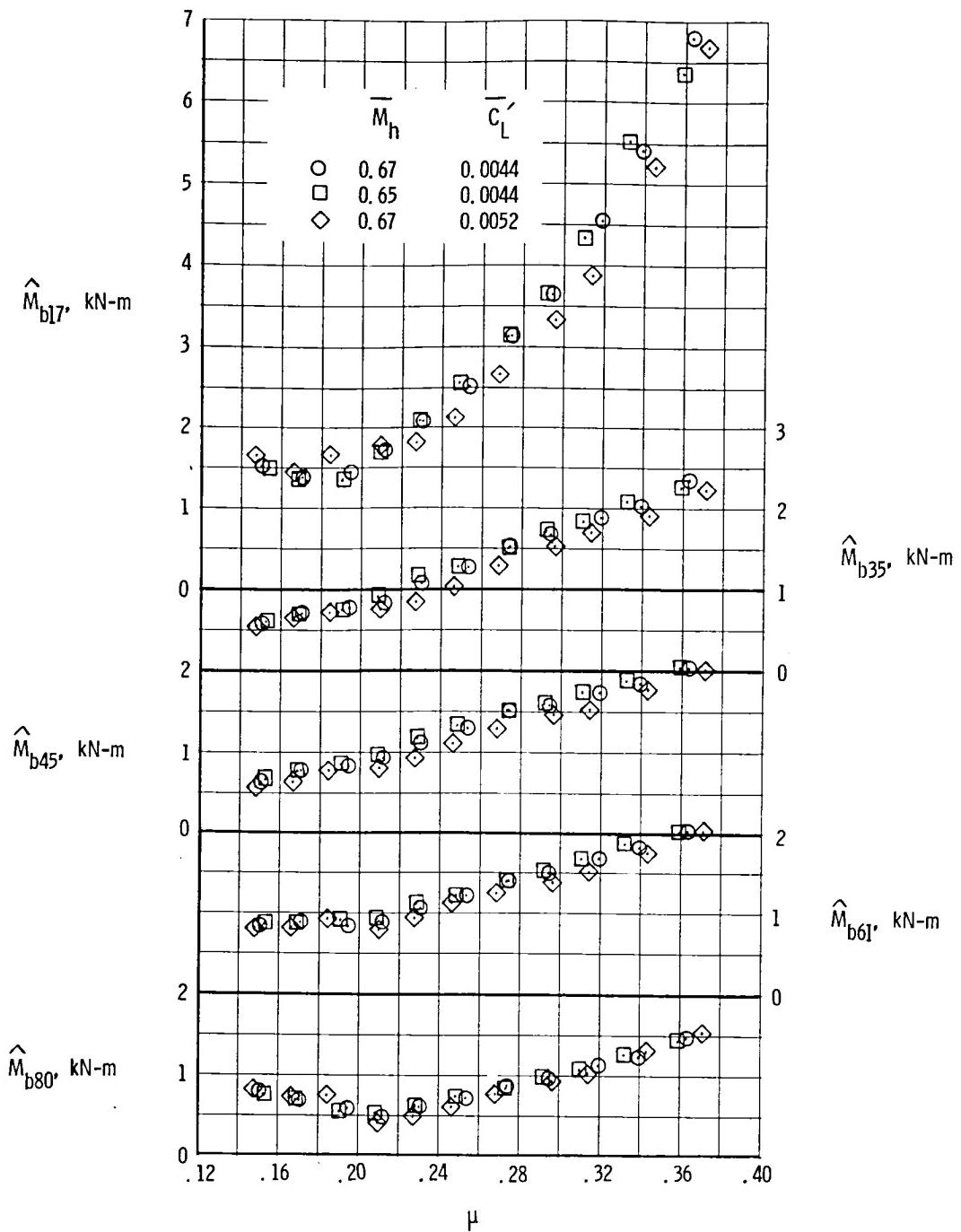
(c) Aircraft control positions.

Figure 6. - Continued.



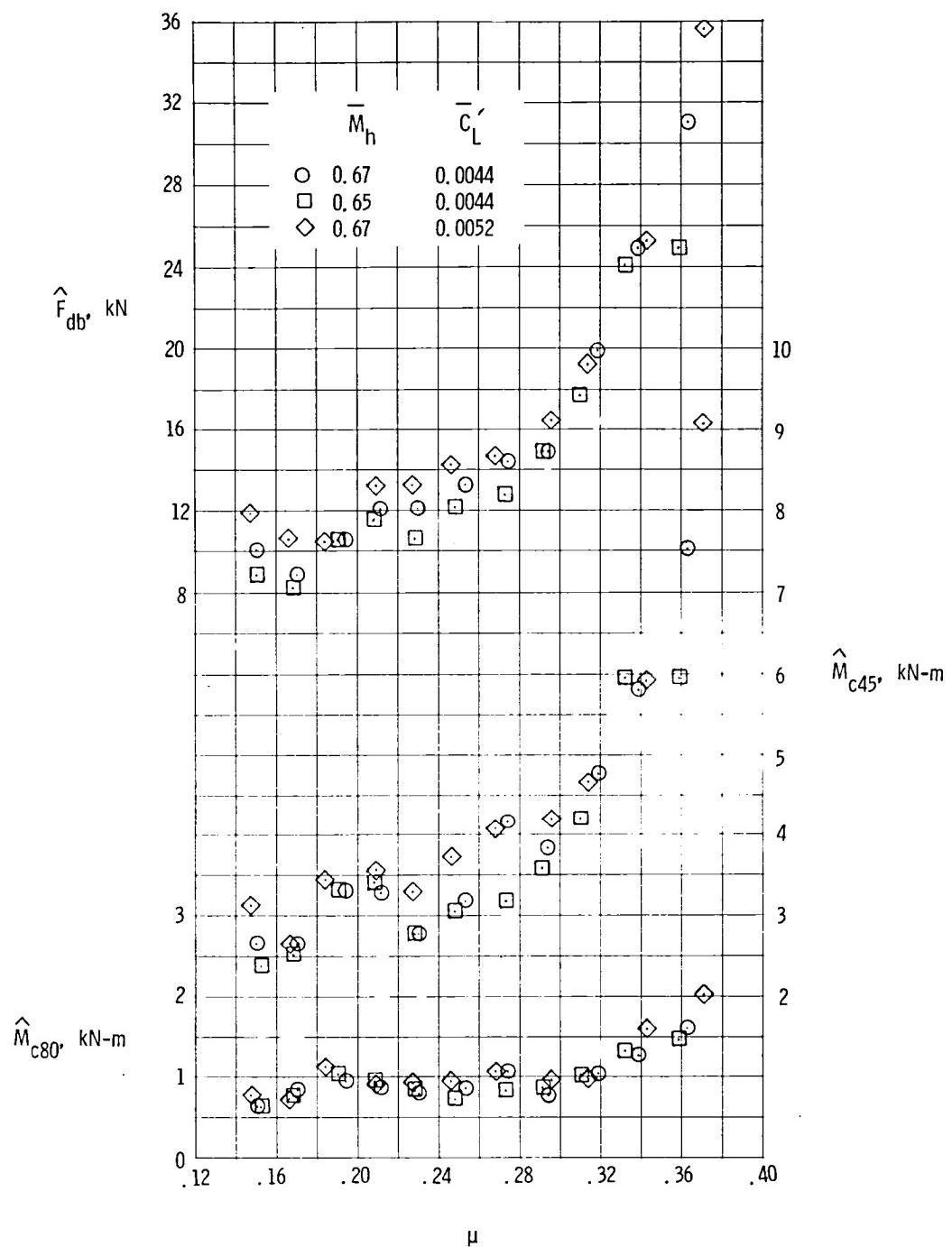
(d) Rotor-blade pitch and teeter angles.

Figure 6. - Continued.



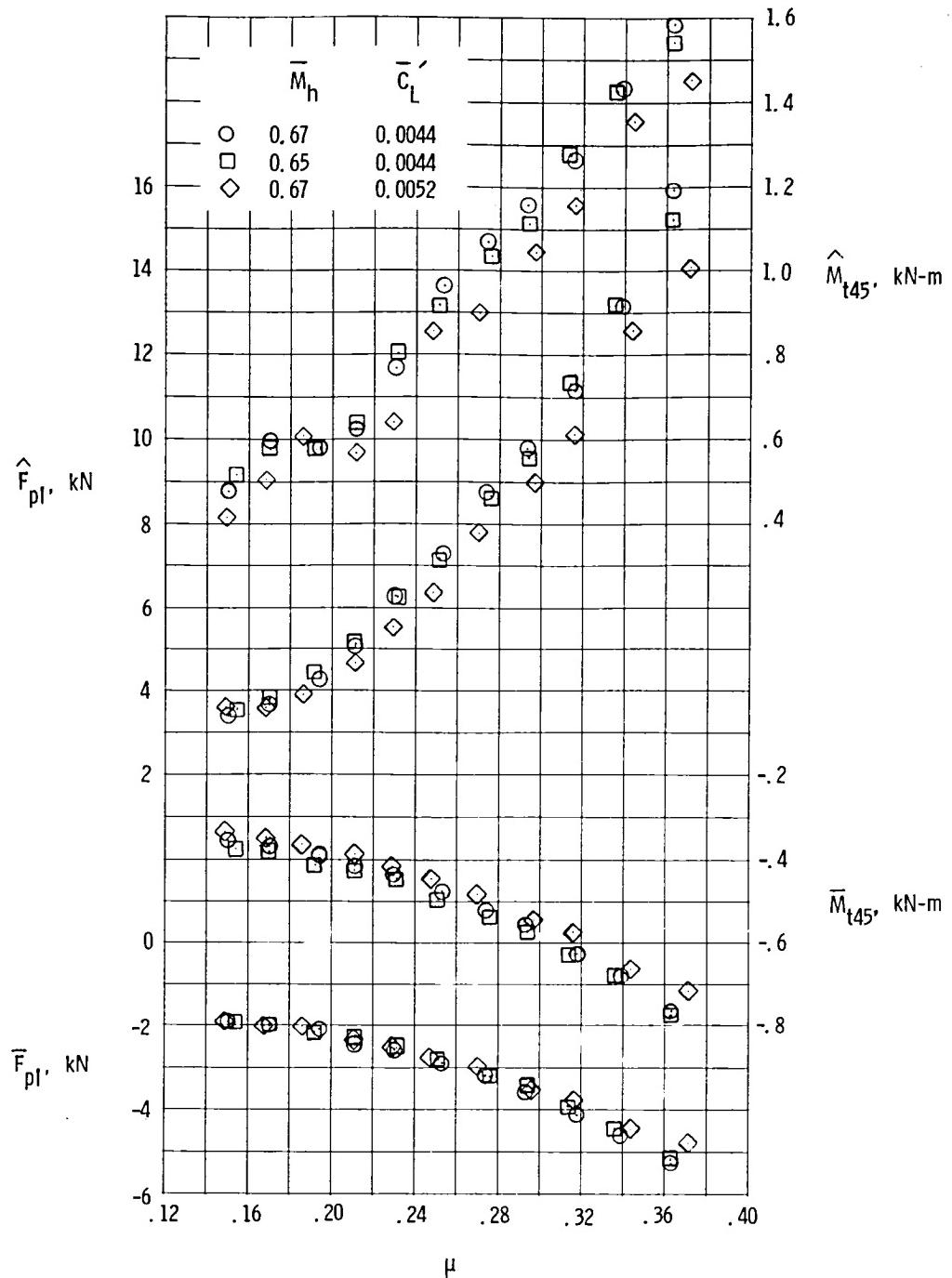
(e) Beamwise peak-to-peak rotor loads.

Figure 6. - Continued.



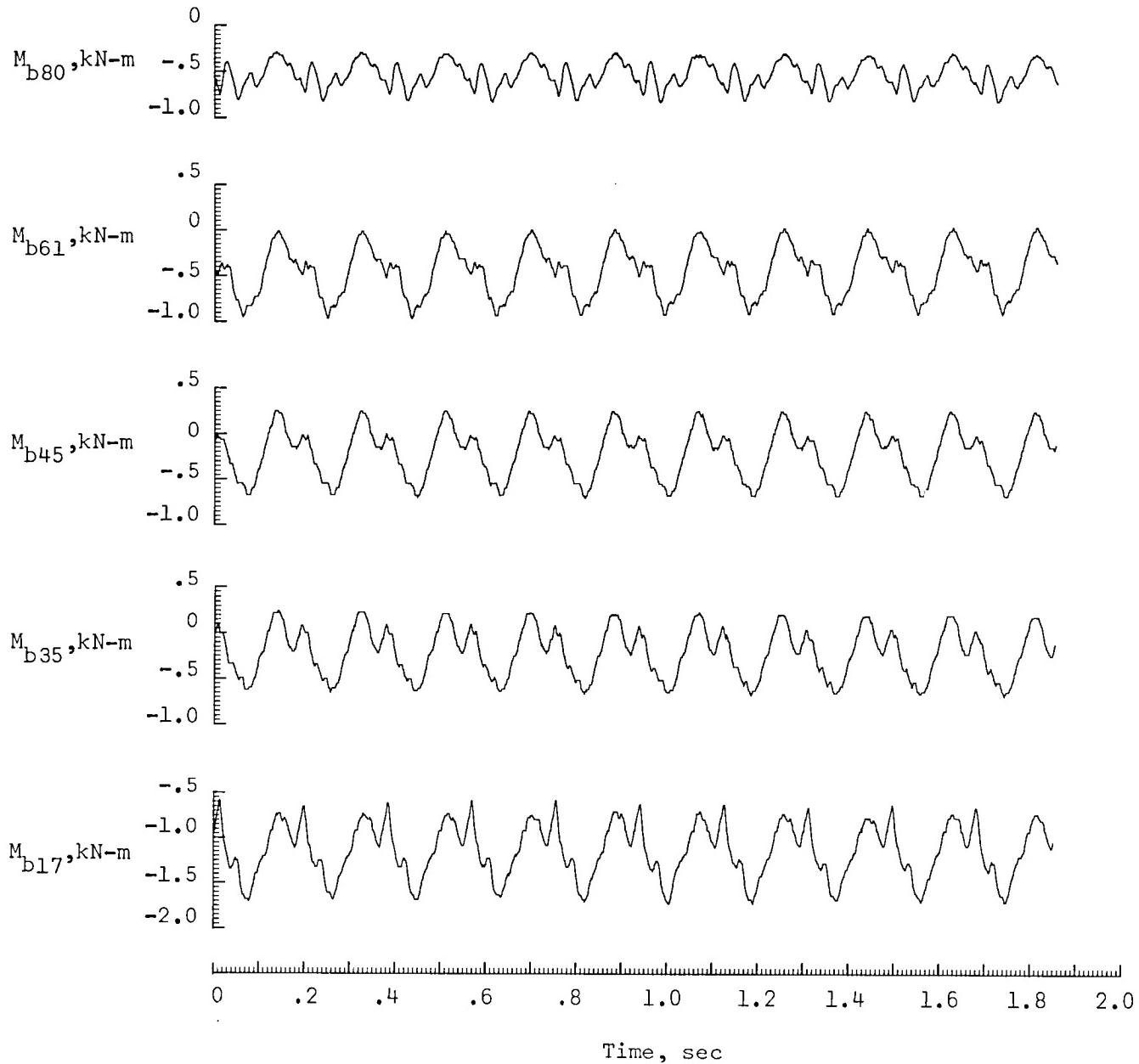
(f) Chordwise peak-to-peak rotor loads.

Figure 6. - Continued.



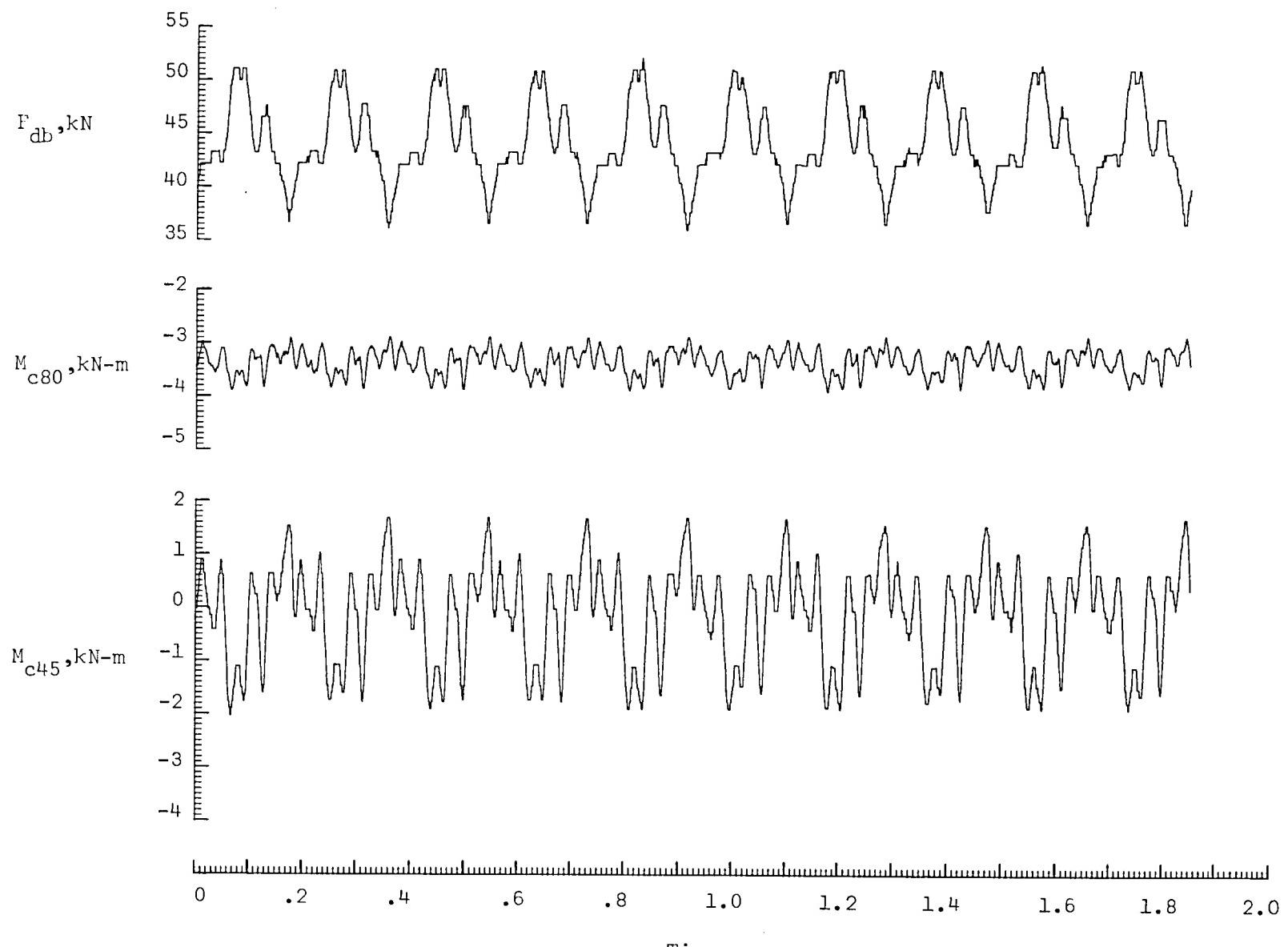
(g) Blade torsion and pitch-link loads.

Figure 6. - Concluded.

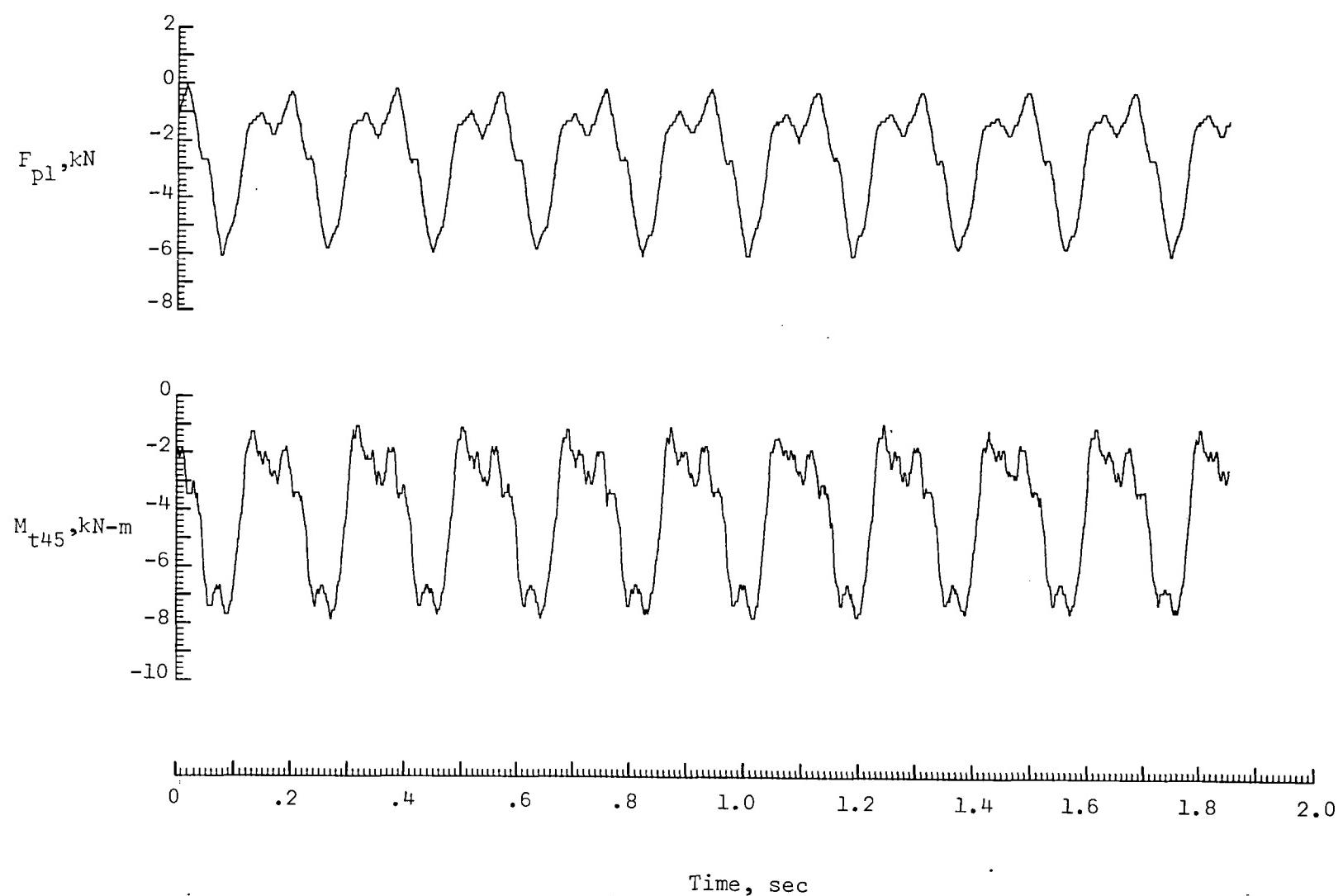


(a) Beamwise loads

Figure 7.- Rotor-load histories for typical level-flight condition  
 (Flight 81, run 7 of Appendix A).  $\mu = 0.23$ ;  $C_L^r = 0.0052$ .

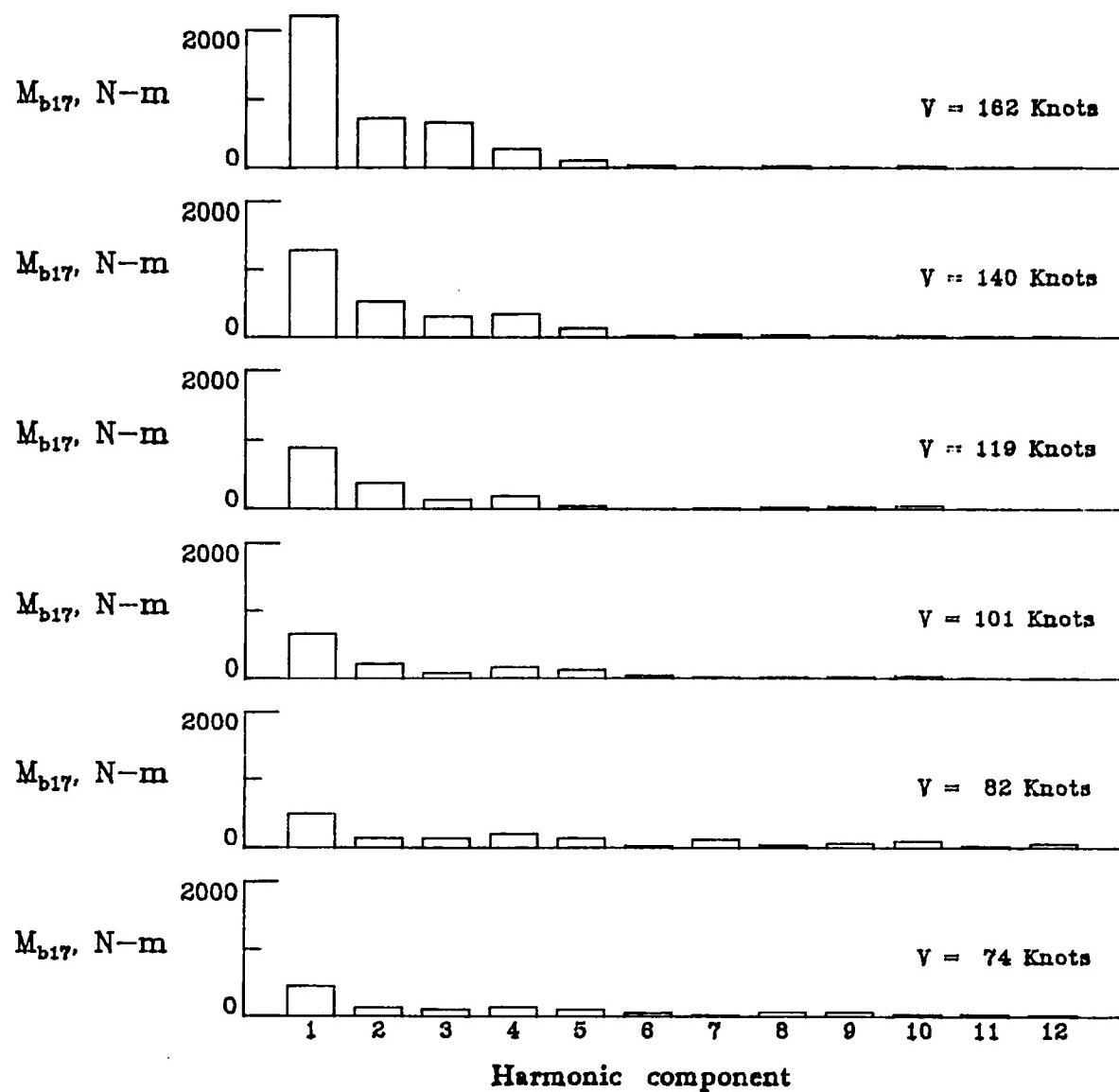


(b) Chordwise loads



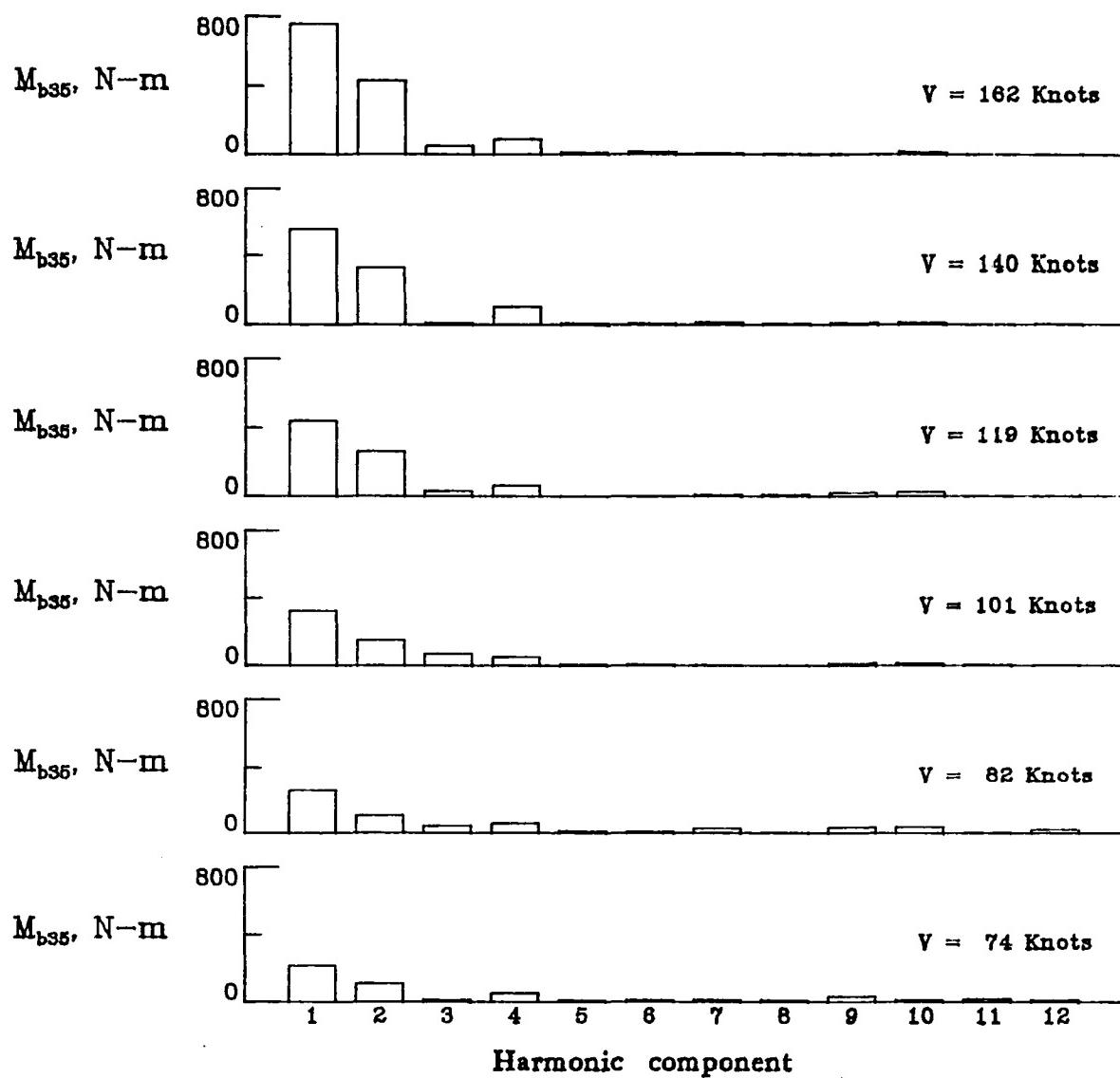
(c) Torsional loads

Figure 7.-Concluded.



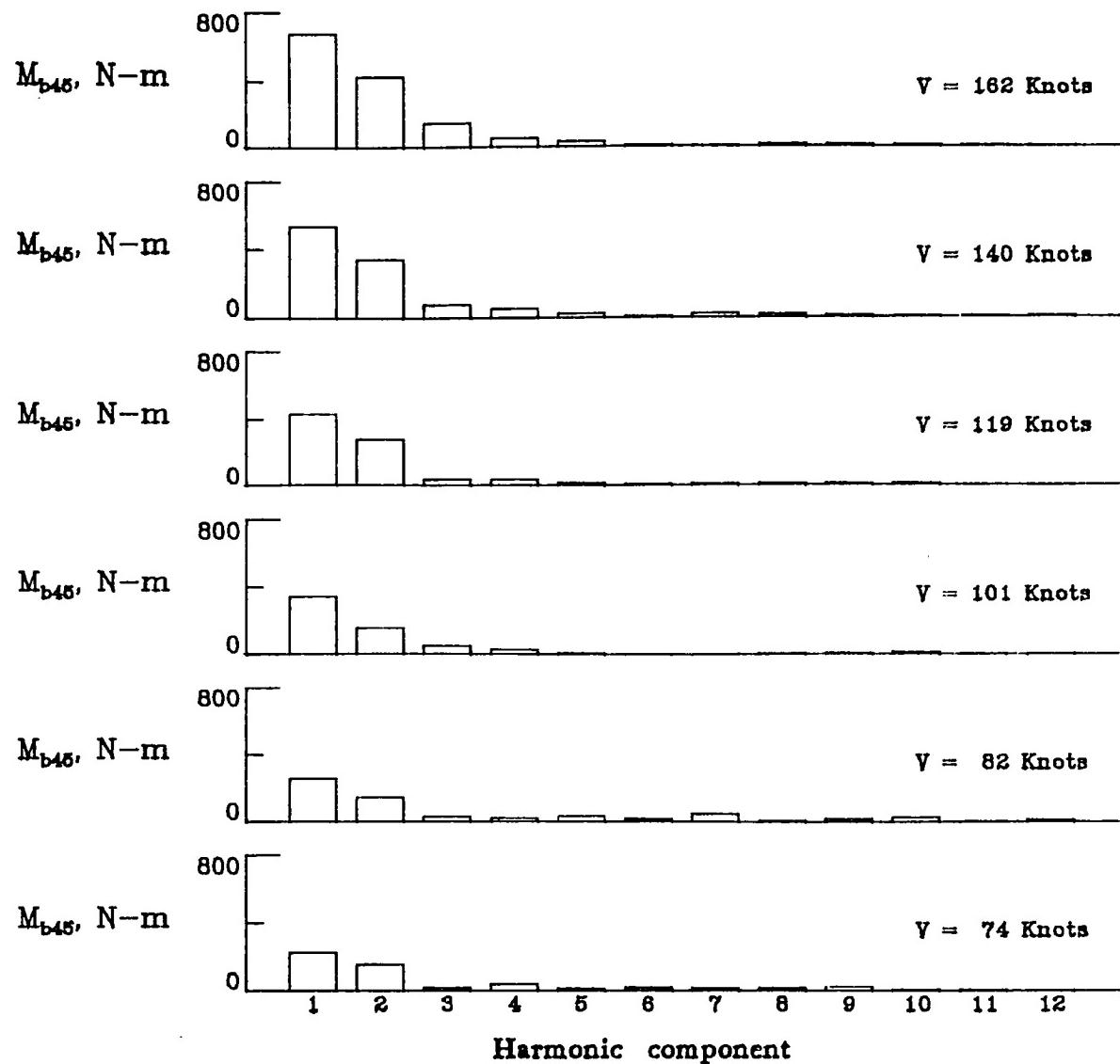
(a)  $M_{b17}$

Figure 8.- Harmonic content of rotor loads for level flight.  $C_L^t = 0.0052$ .



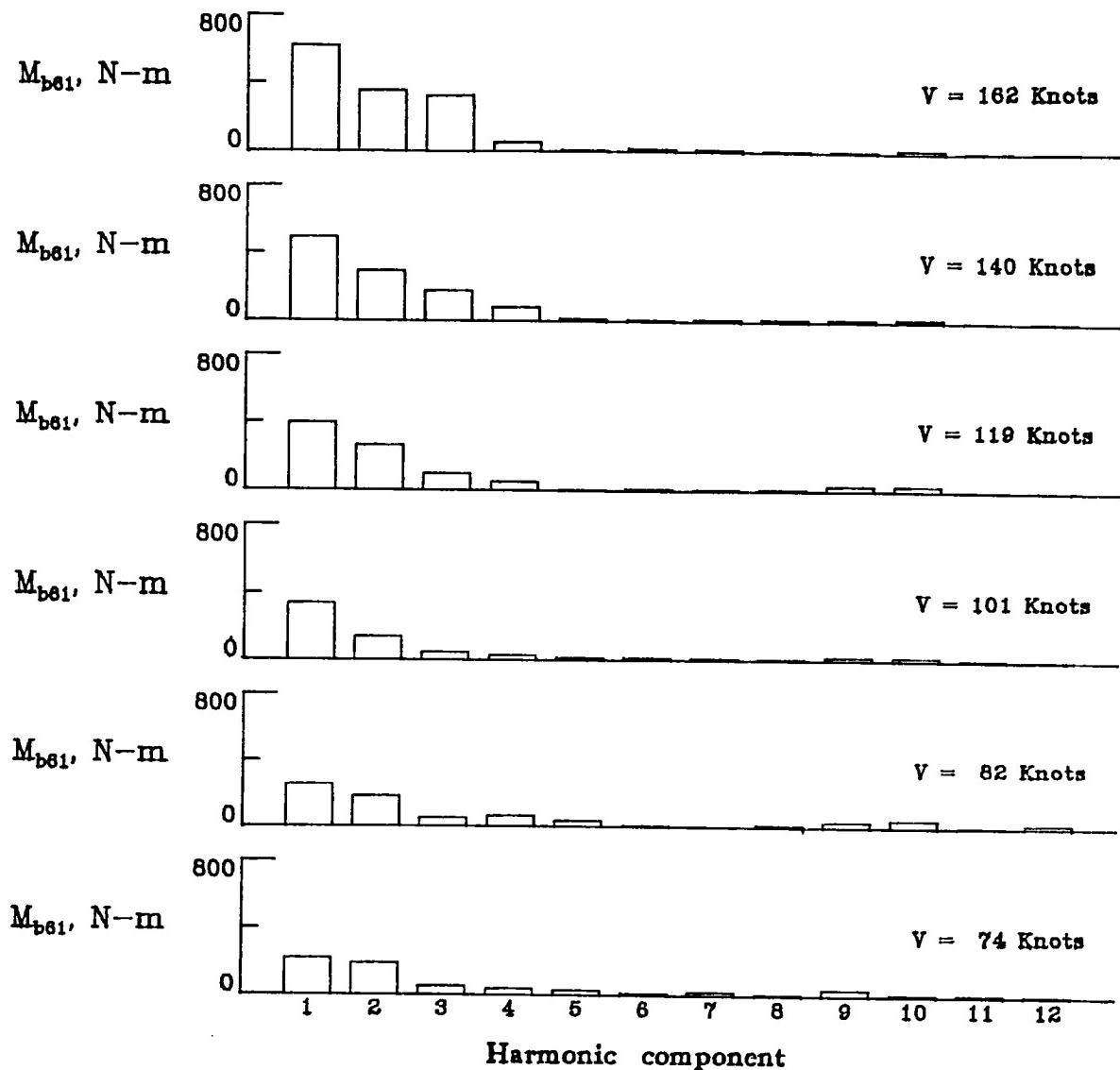
(b)  $M_{b35}$

Figure 8.- Continued.



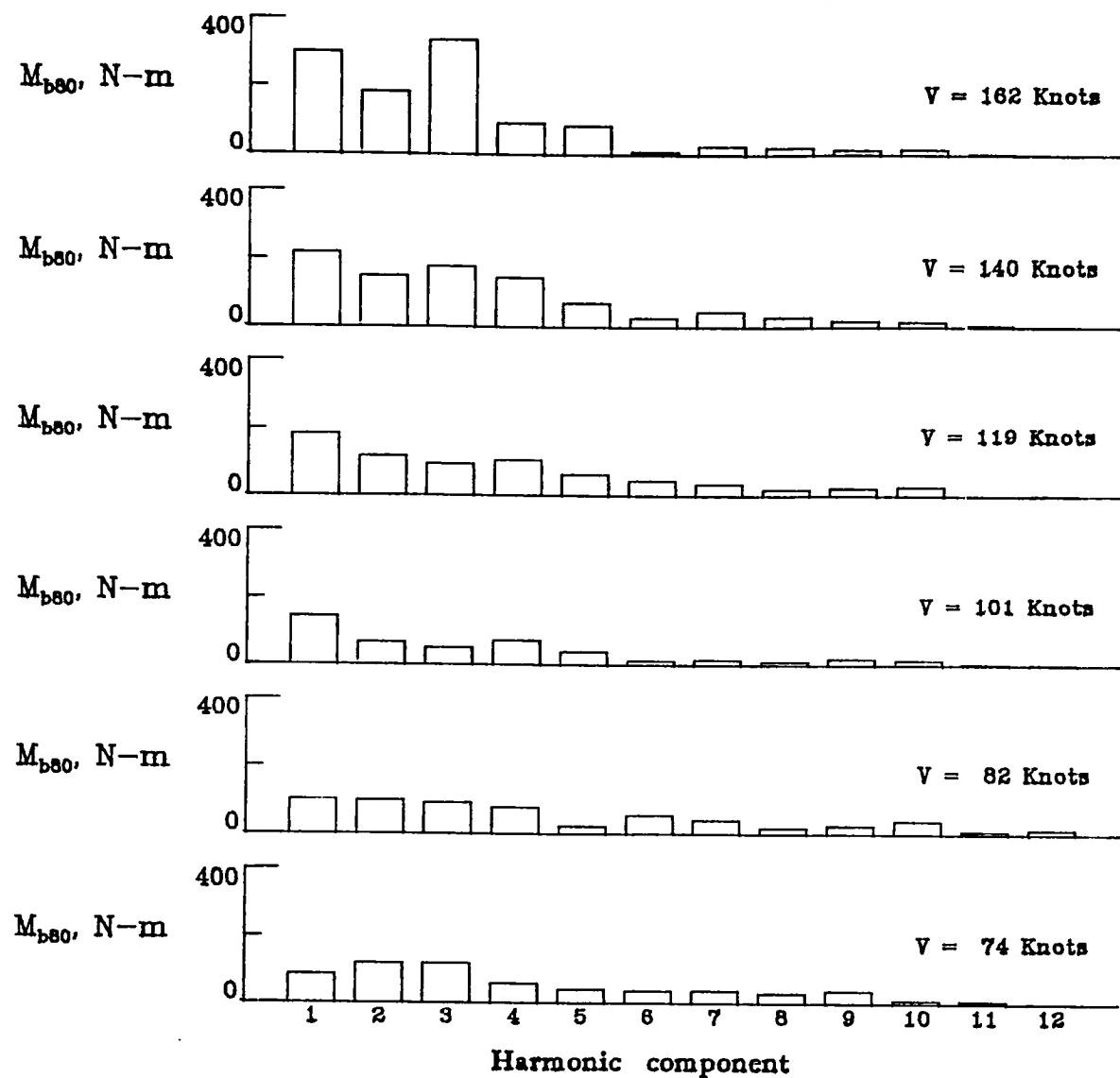
(c)  $M_{b45}$

Figure 8.- Continued.



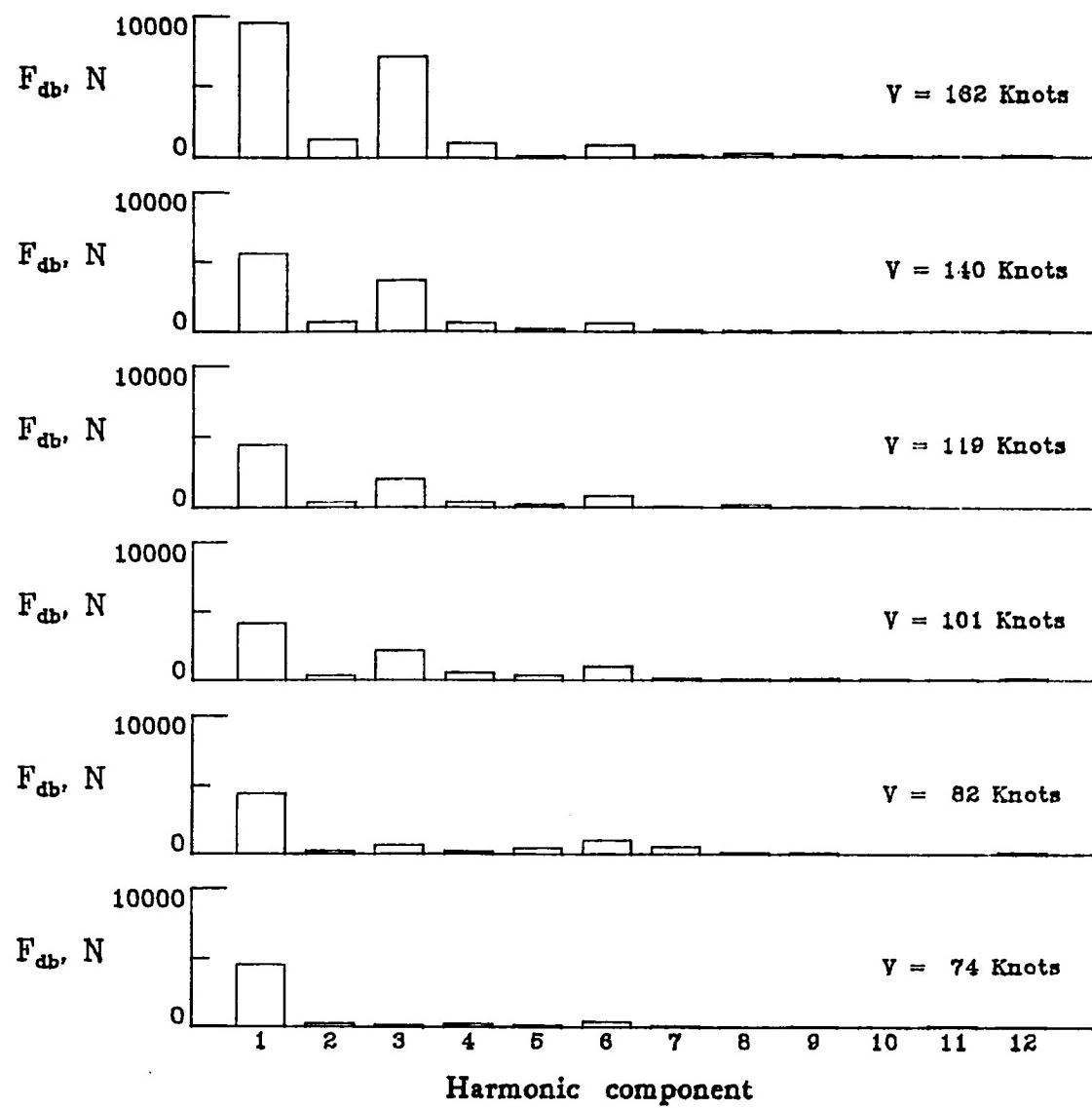
(d)  $M_{b61}$

Figure 8.- Continued.



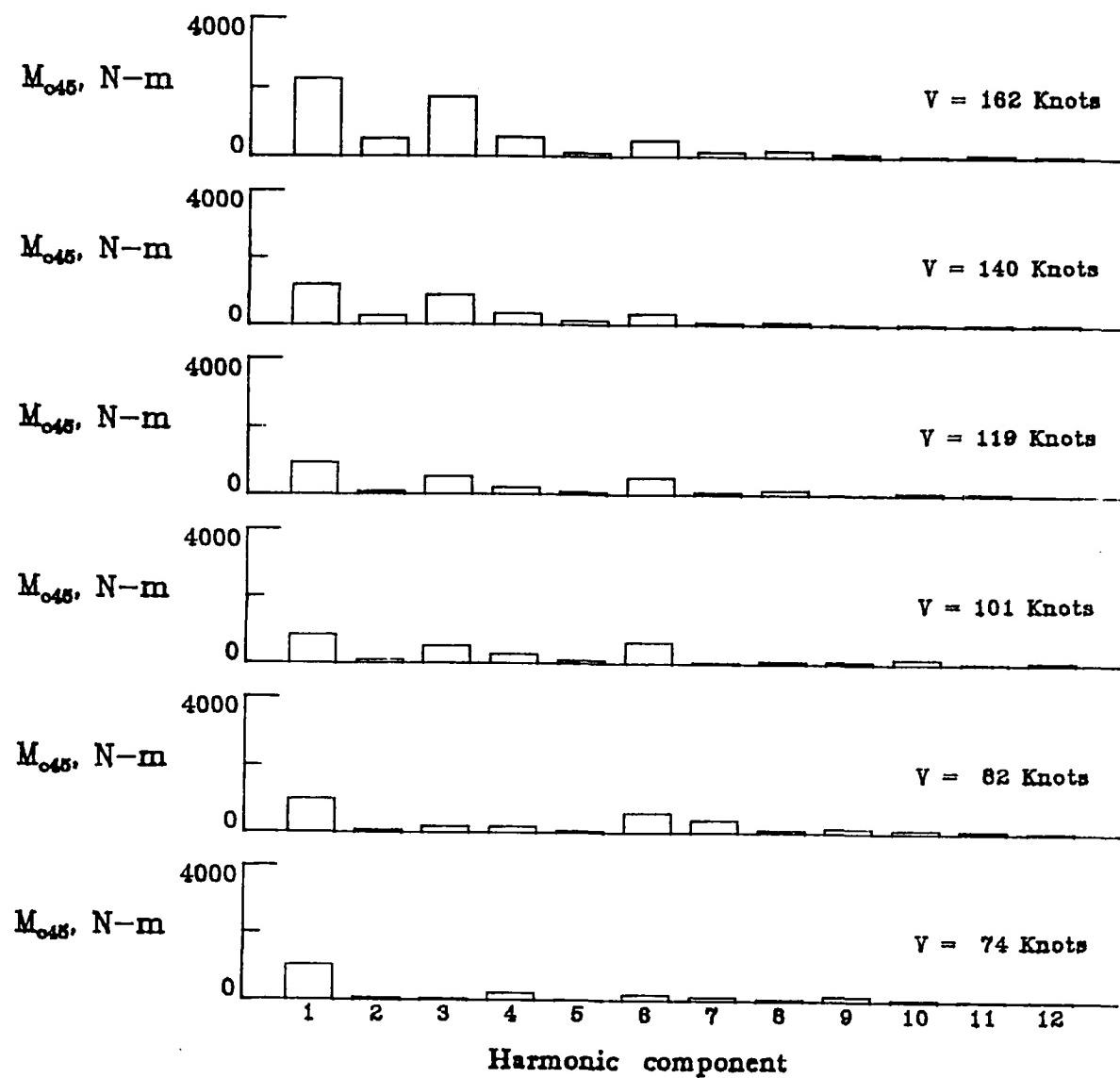
(e)  $M_{b80}$

Figure 8.- Continued.



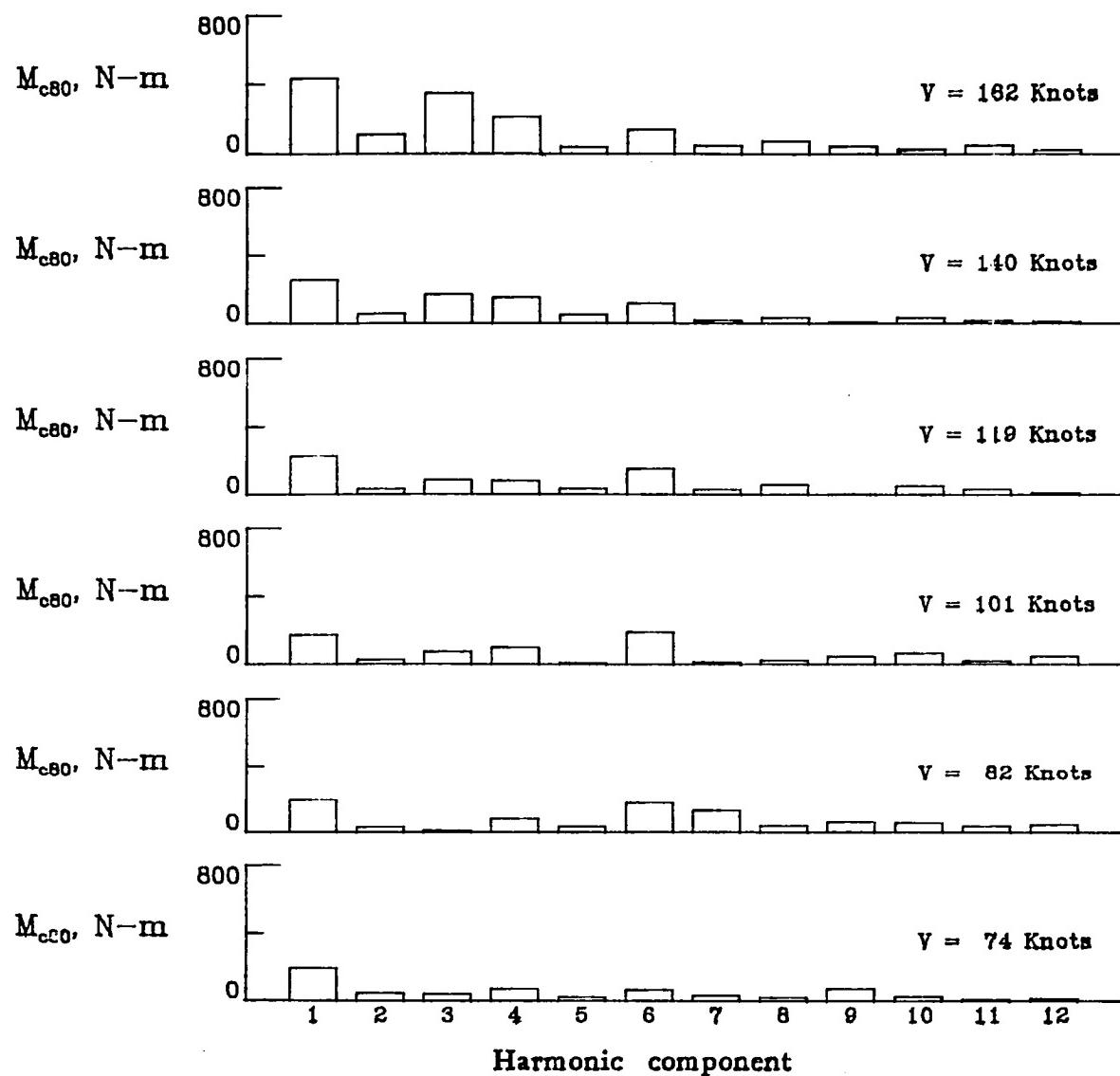
(f)  $F_{db}$

Figure 8.- Continued.



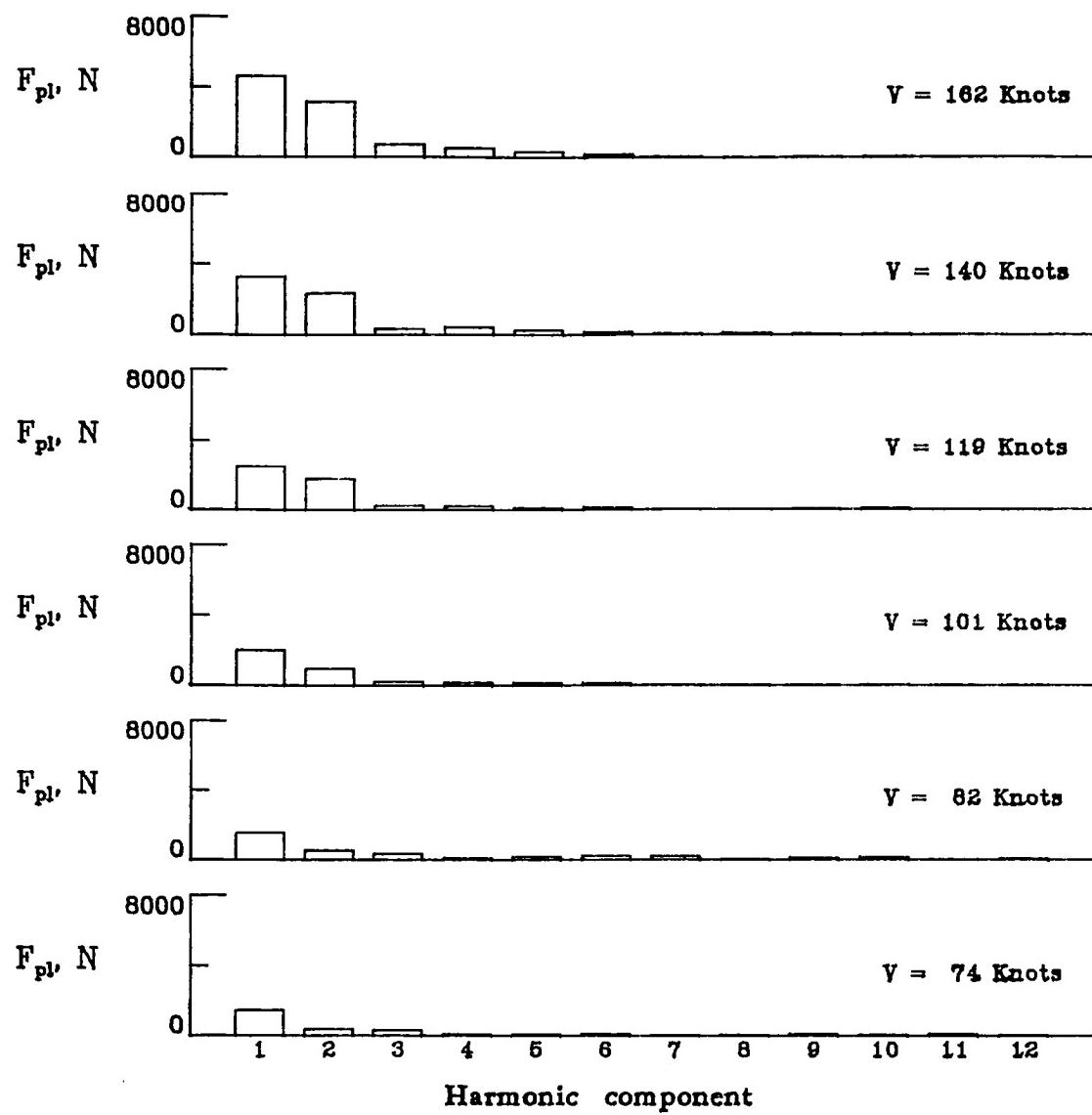
(g)  $M_{c45}$

Figure 8.- Continued.



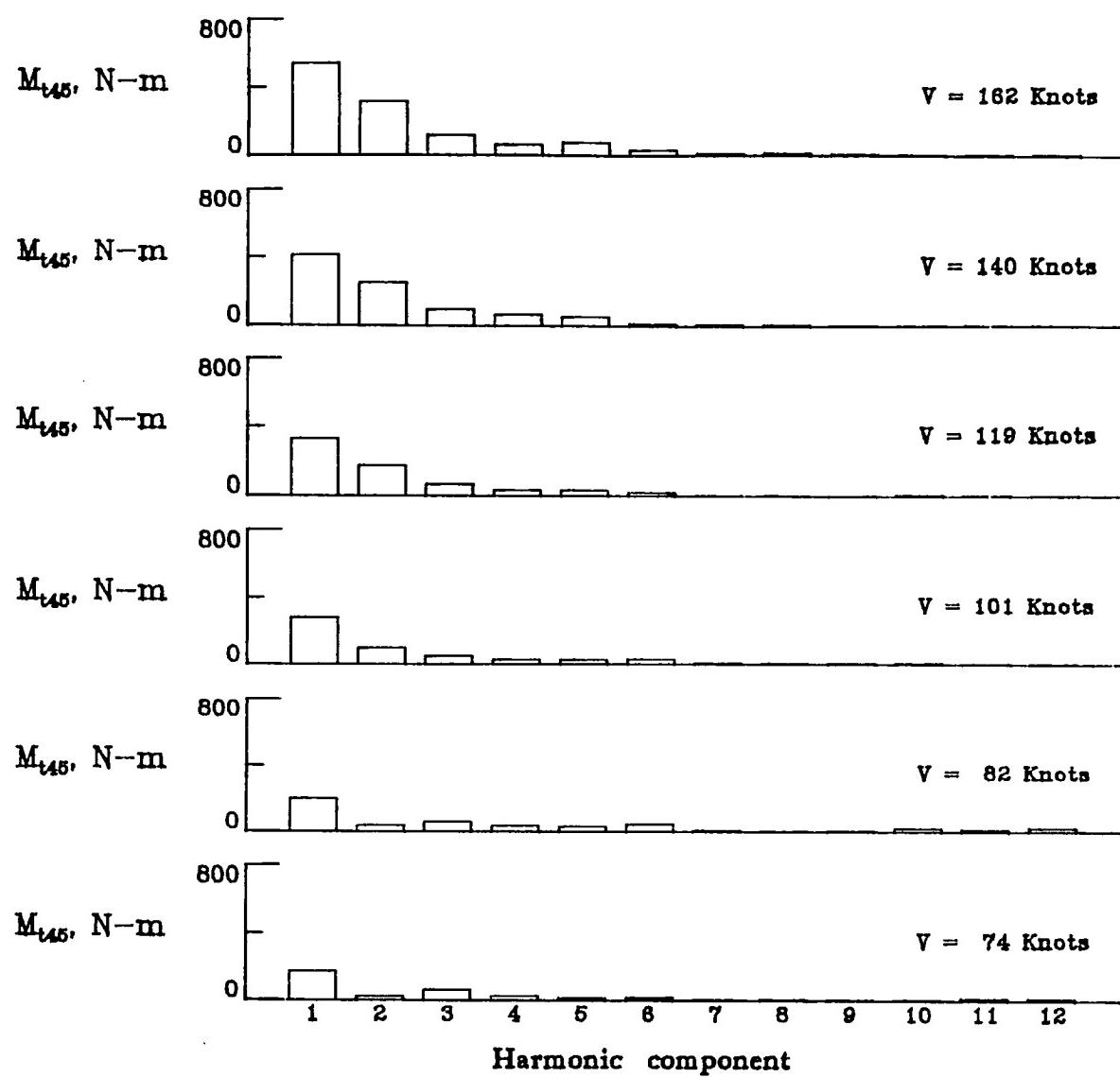
(h)  $M_{c80}$

Figure 8.- Continued.



(i)  $F_{p1}$

Figure 8.- Continued.



(j)  $M_{t45}$

Figure 8.- Concluded.

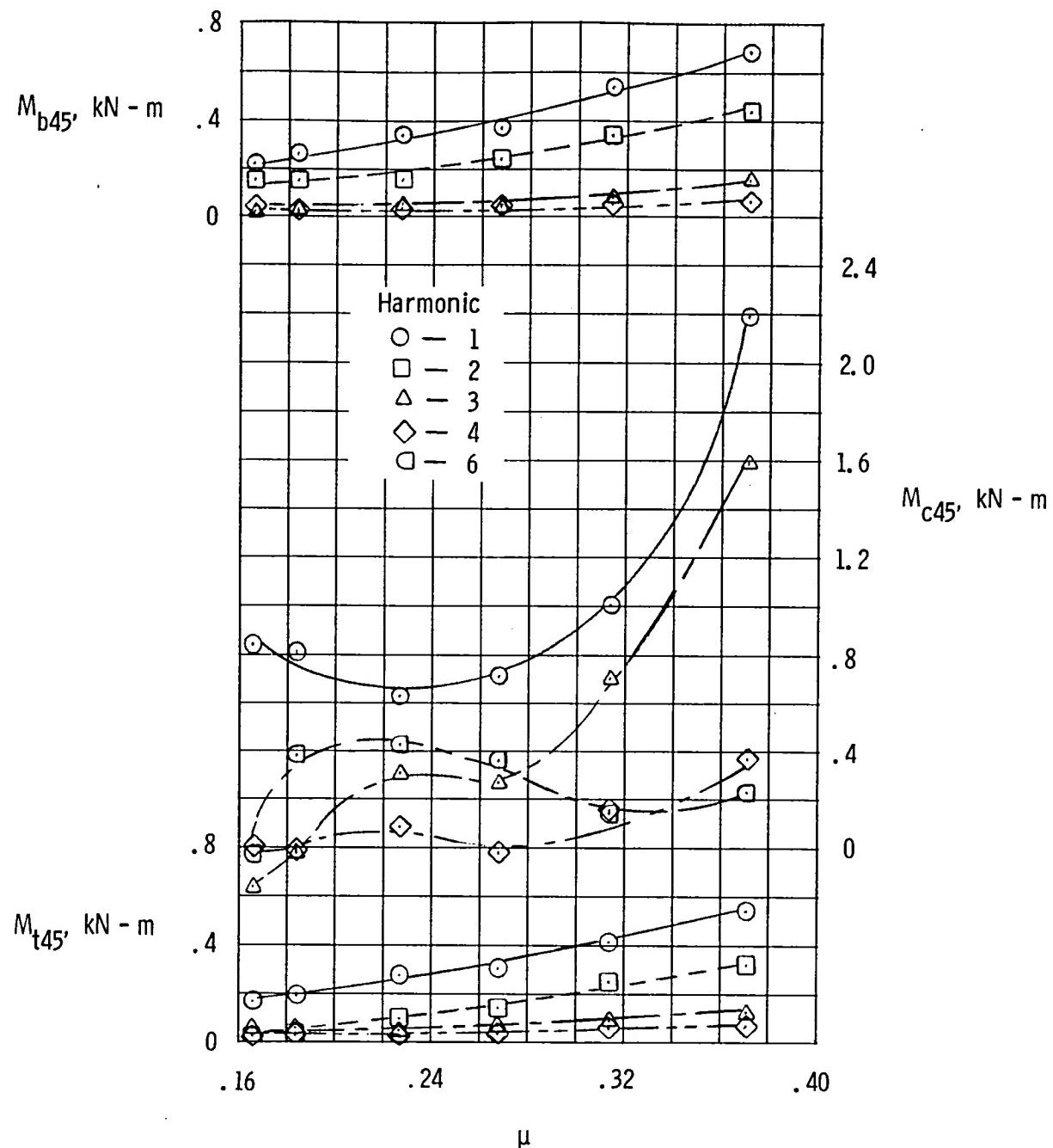
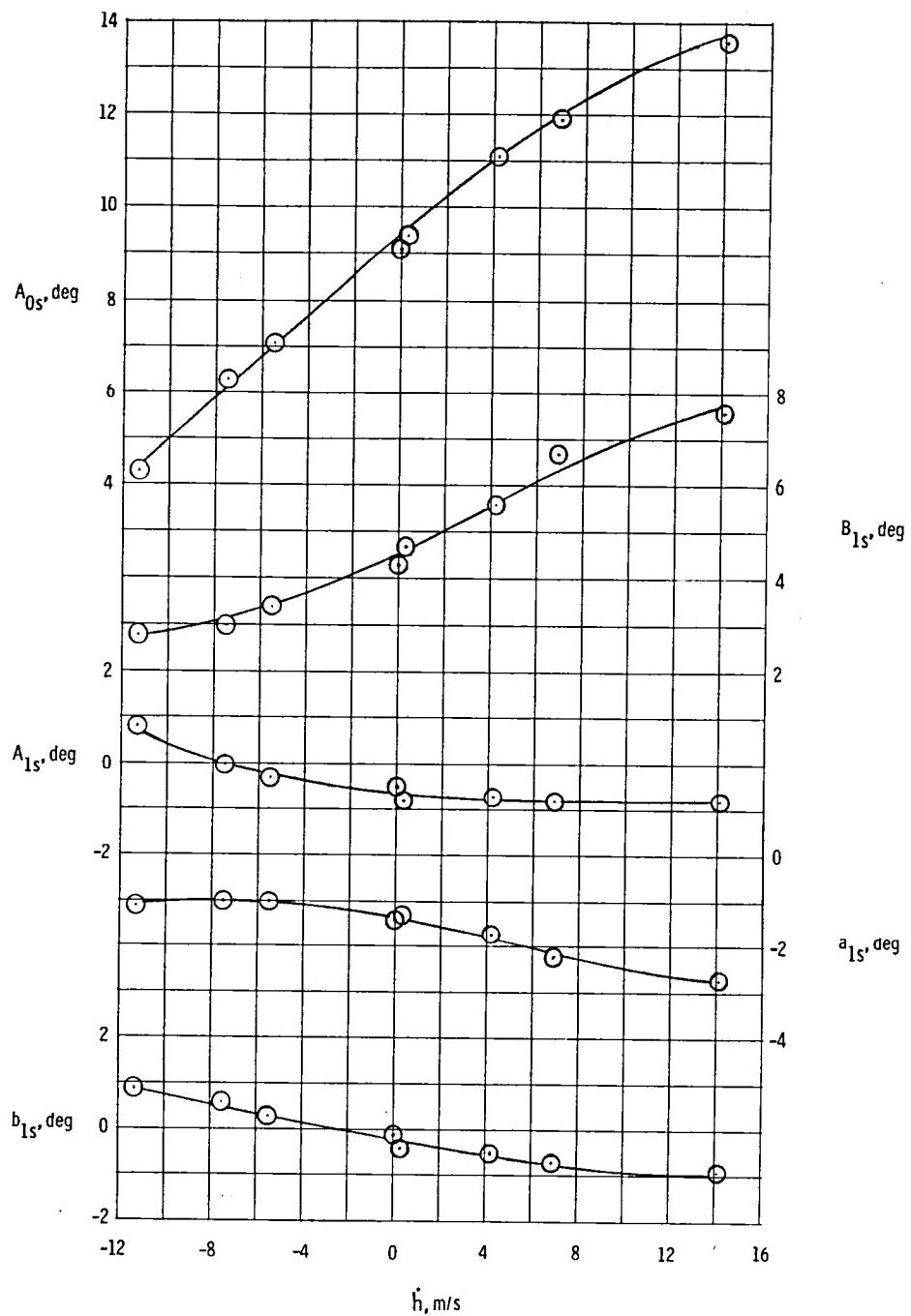
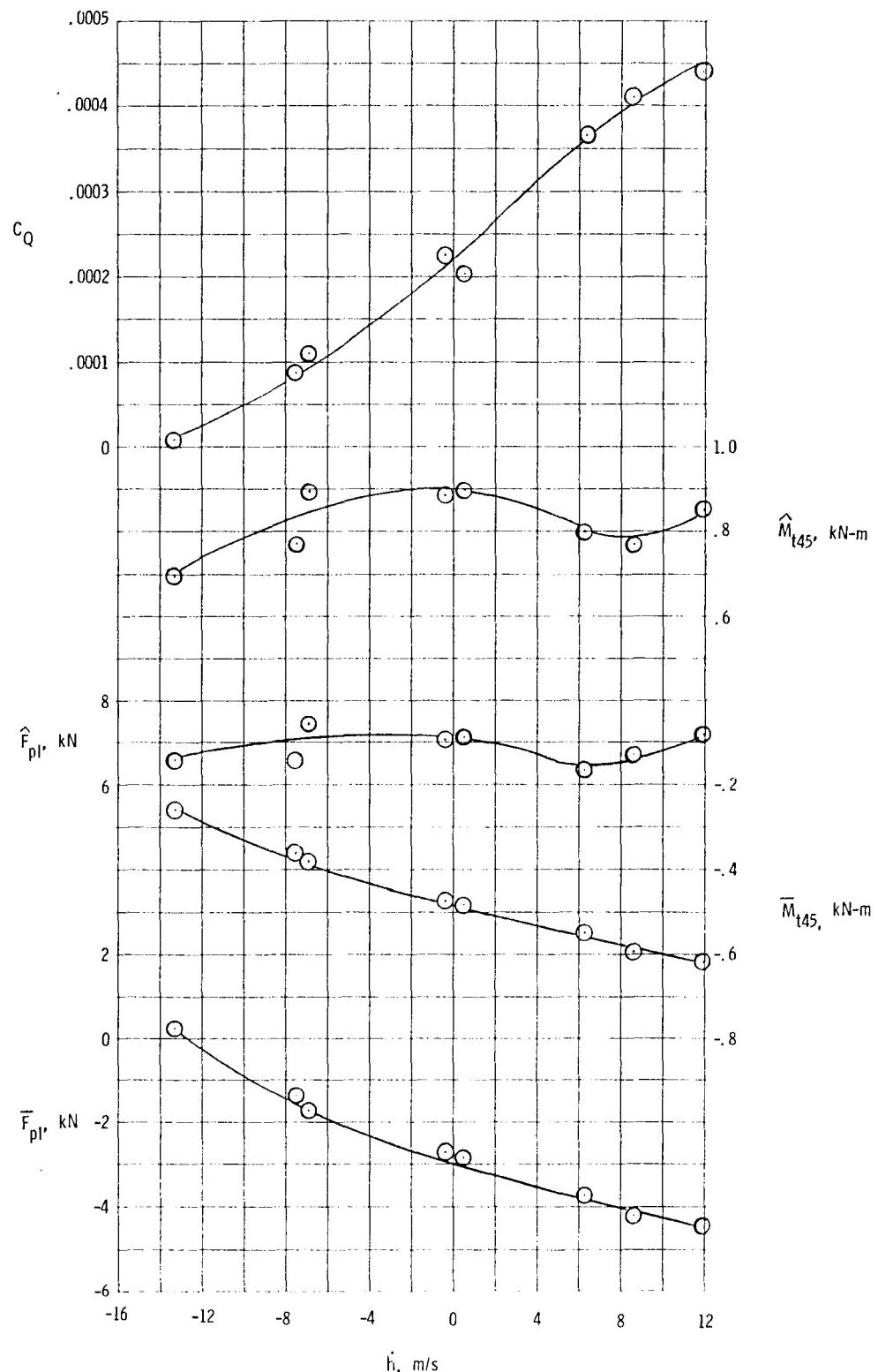


Figure 9. - Effect of tip-speed ratio on primary harmonic-load components at 0.45R.



(a) Rotor angles

Figure 10. - Effect of rate of climb on rotor angles, loads and torque required.  $\bar{\mu} = 0.24$ ;  $C_L' = 0.0045$ .



(b) Rotor torque and torsional loads.

Figure 10.- Concluded.

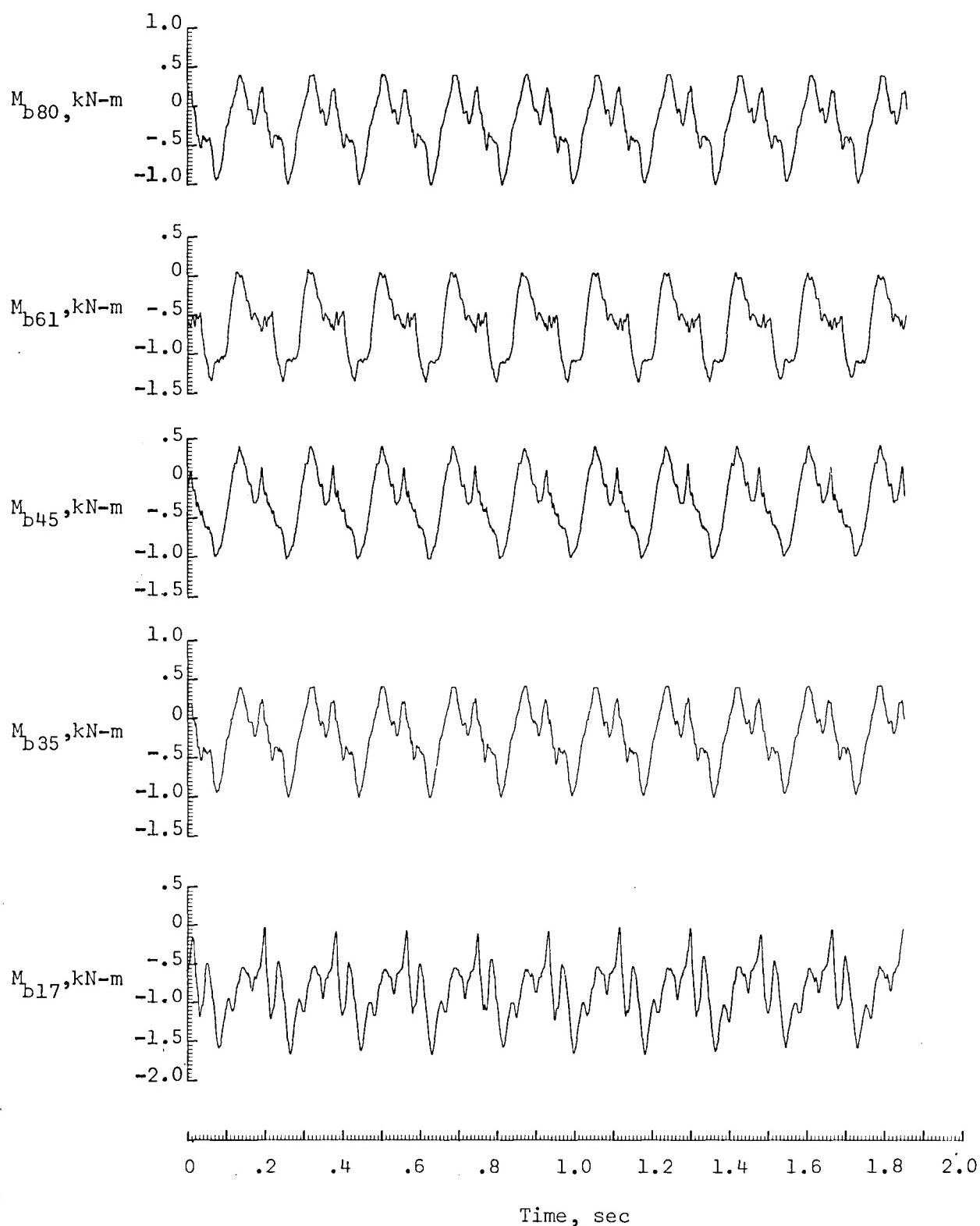
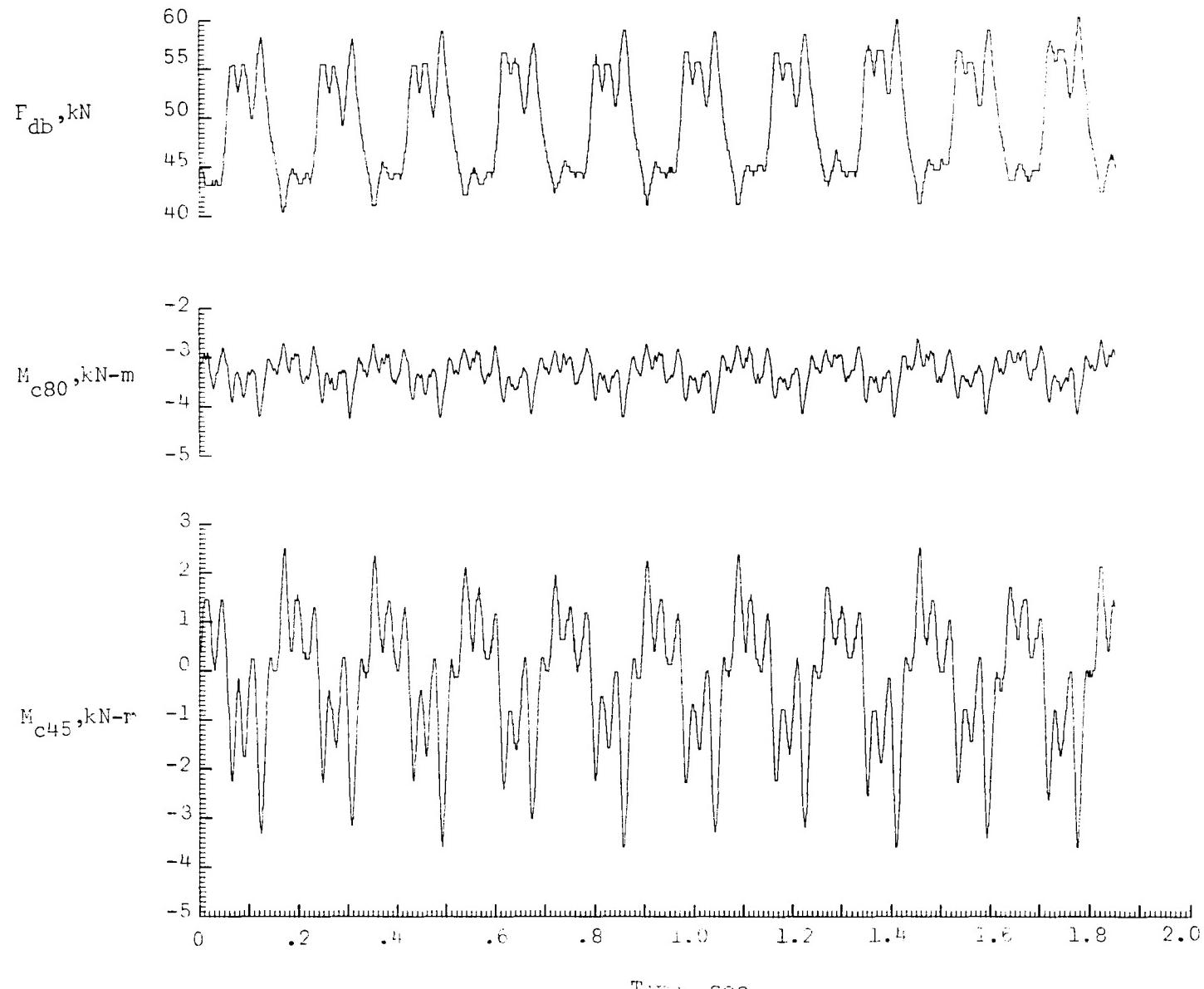


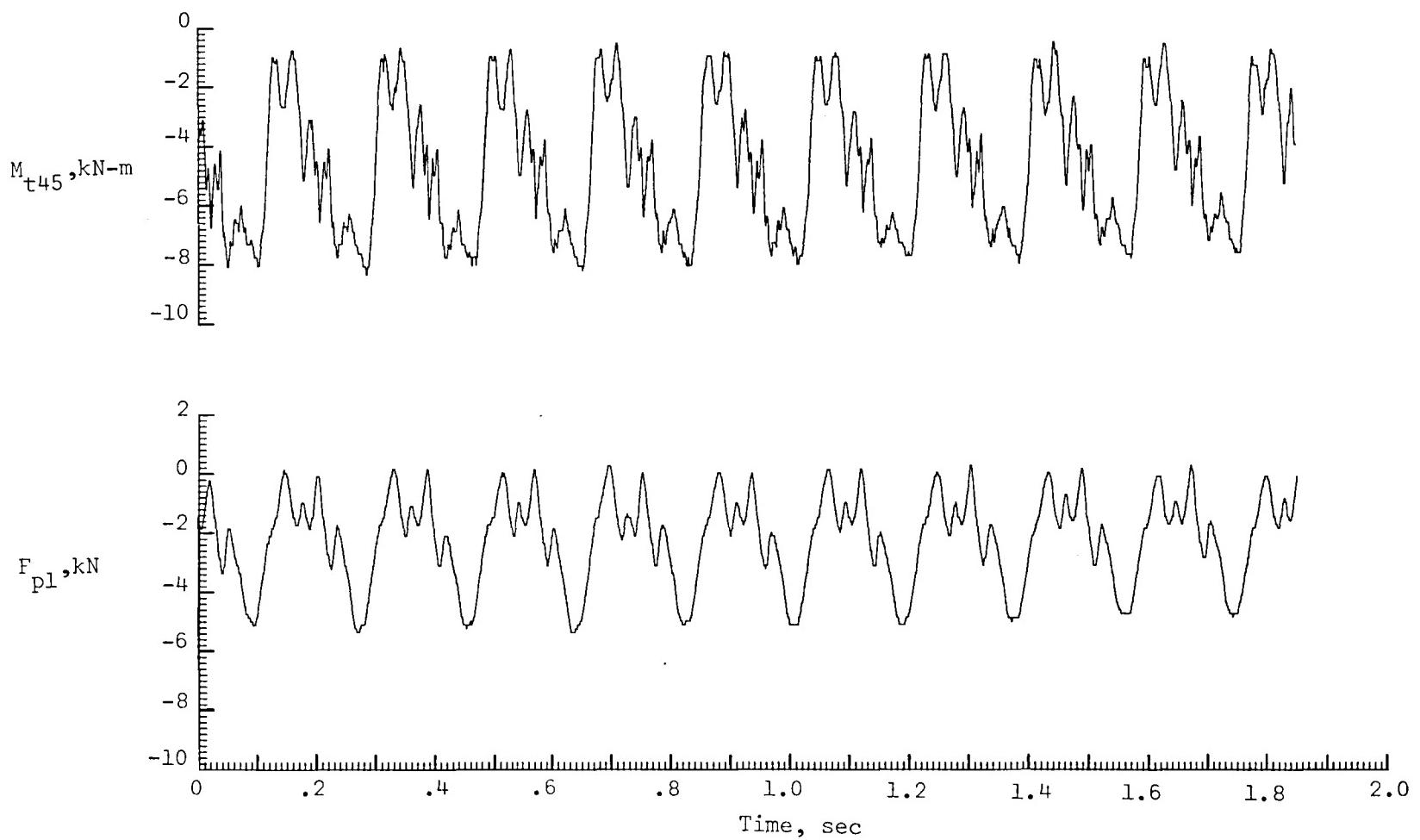
Figure 11. - Rotor-load histories for typical descending left turn  
(Flight 80, run 29 of Appendix A).  $\mu = 0.24$ ;  $C_L' = 0.0071$ .



(b) Chordwise loads

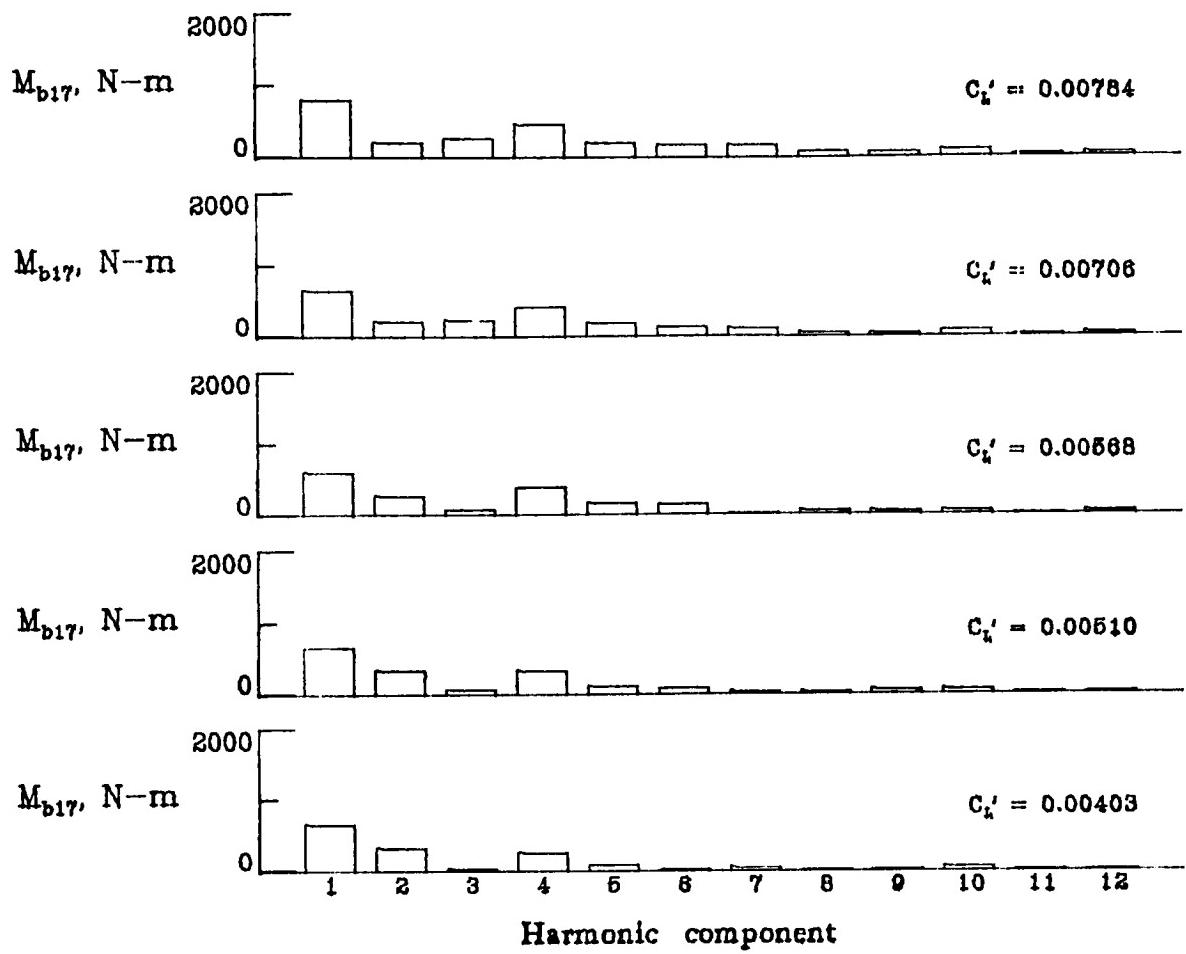
Figure 11.- Continued.

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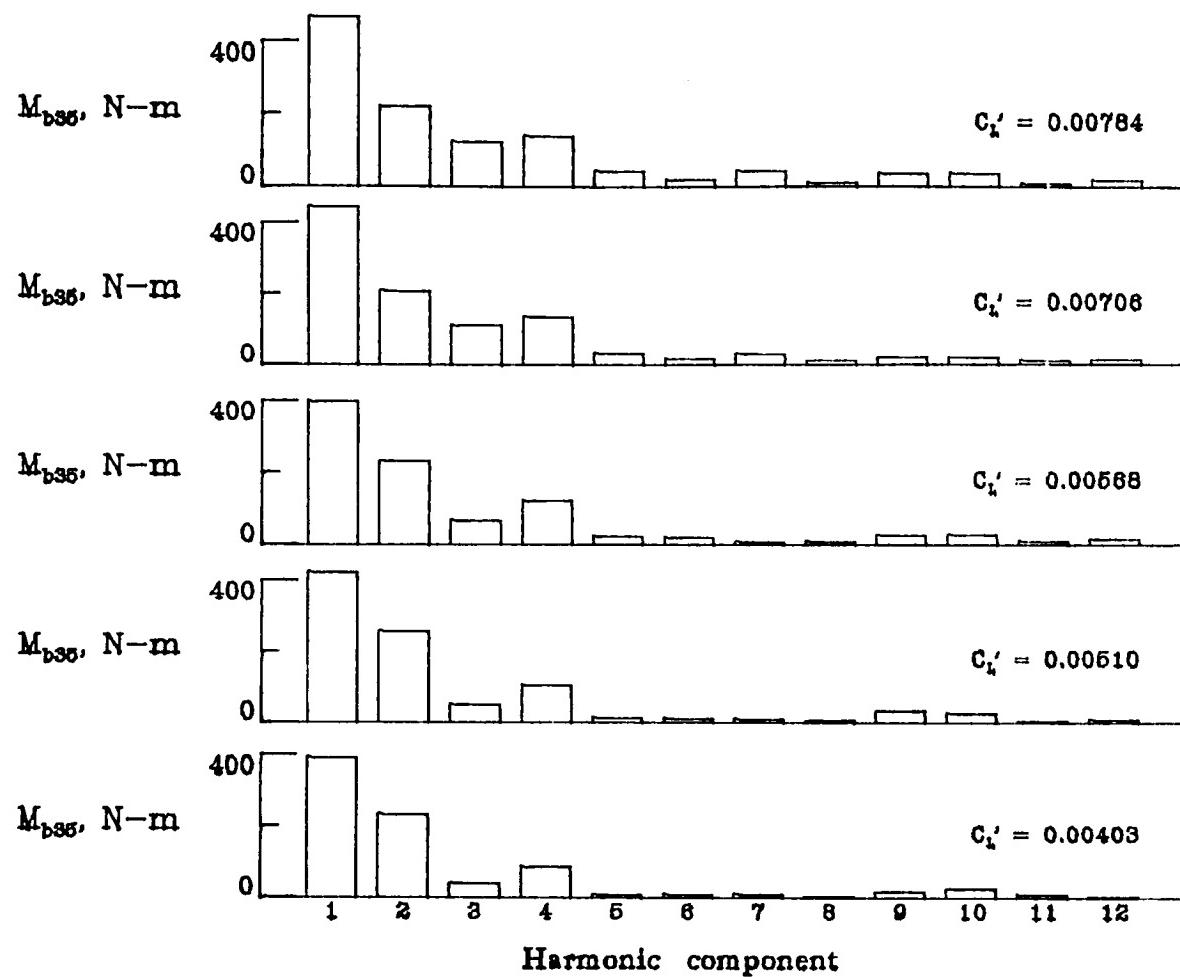
(c) Torsional loads

Figure 11.- Concluded.



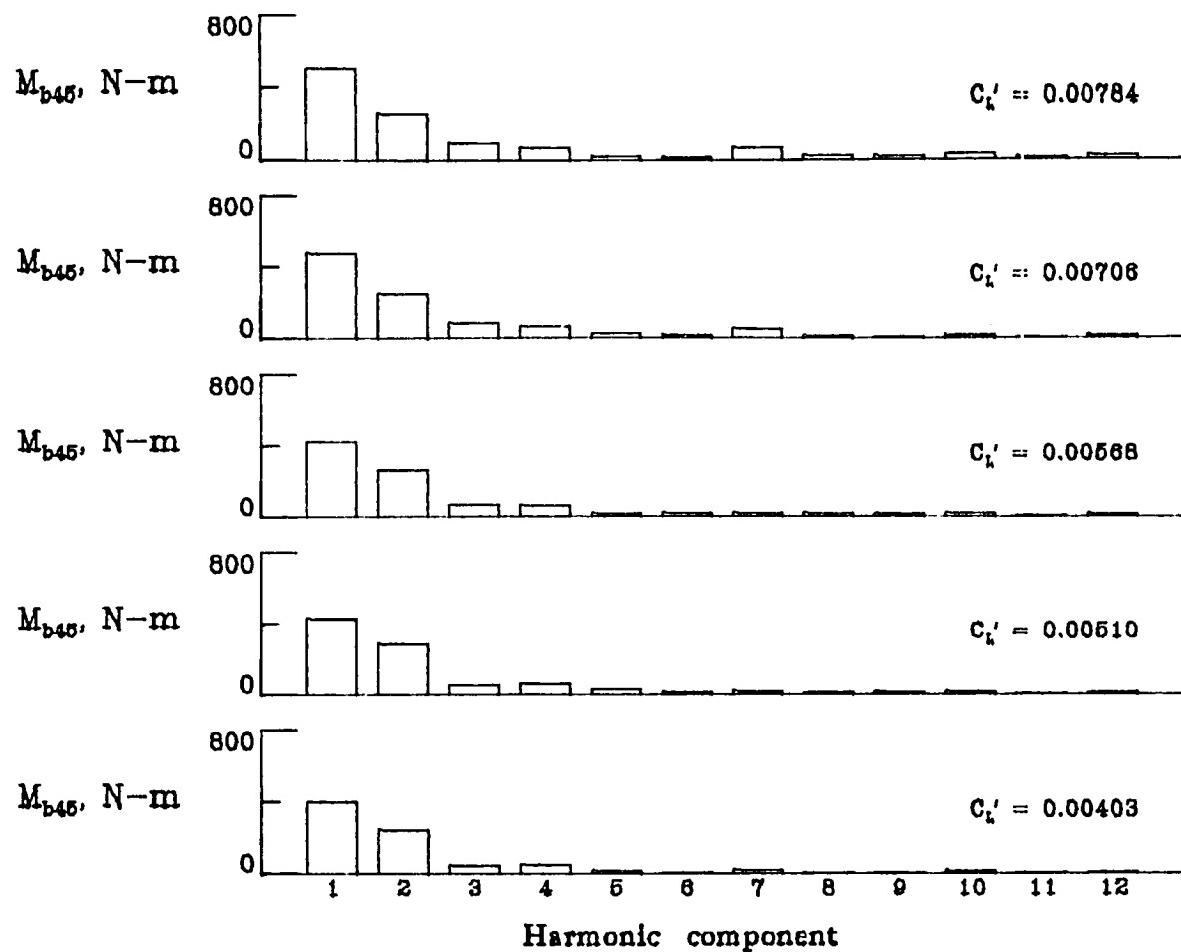
(a)  $M_{b17}$

Figure 12. - Harmonic content of rotor loads for descending left turns.  
 $\bar{u} = 0.24$ .



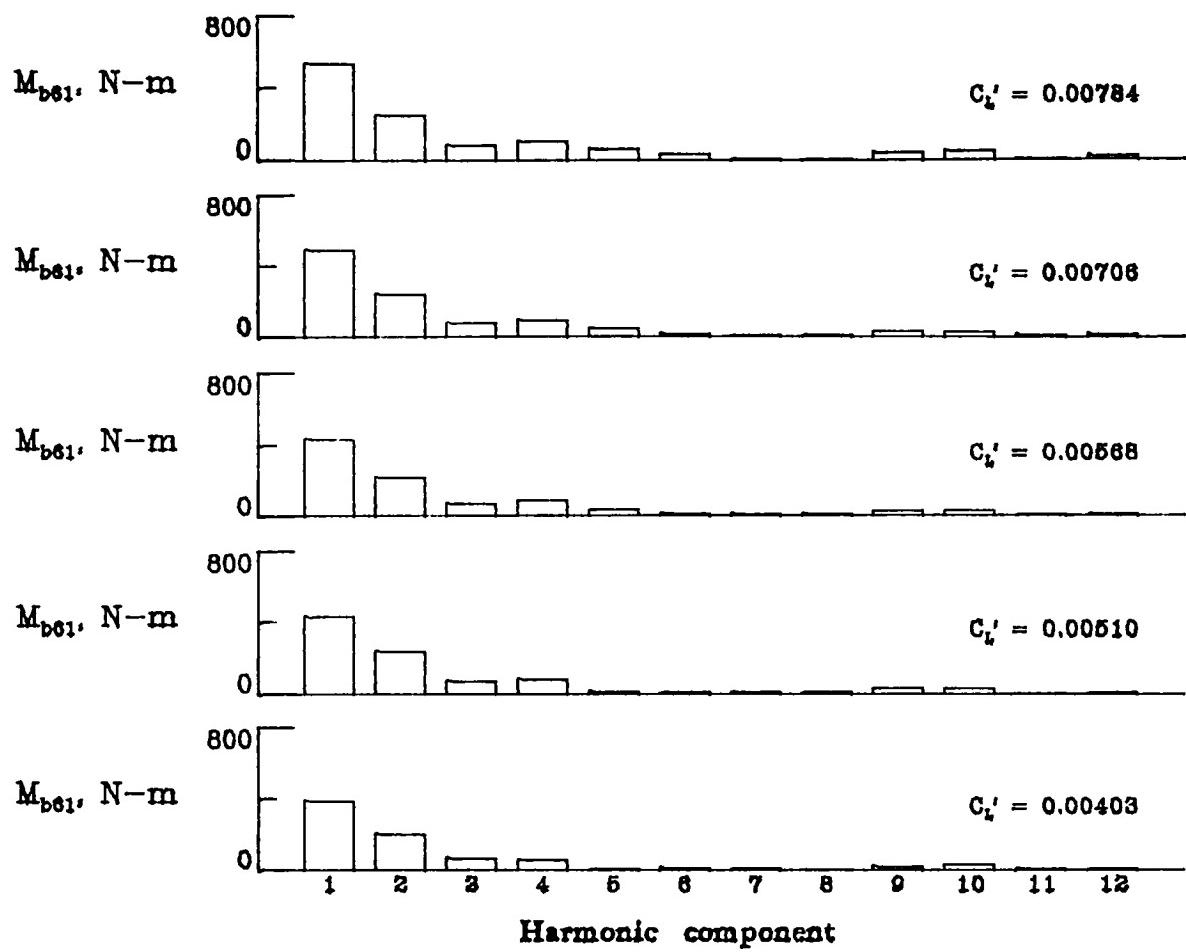
(b)  $M_{b35}$

Figure 12.- Continued.



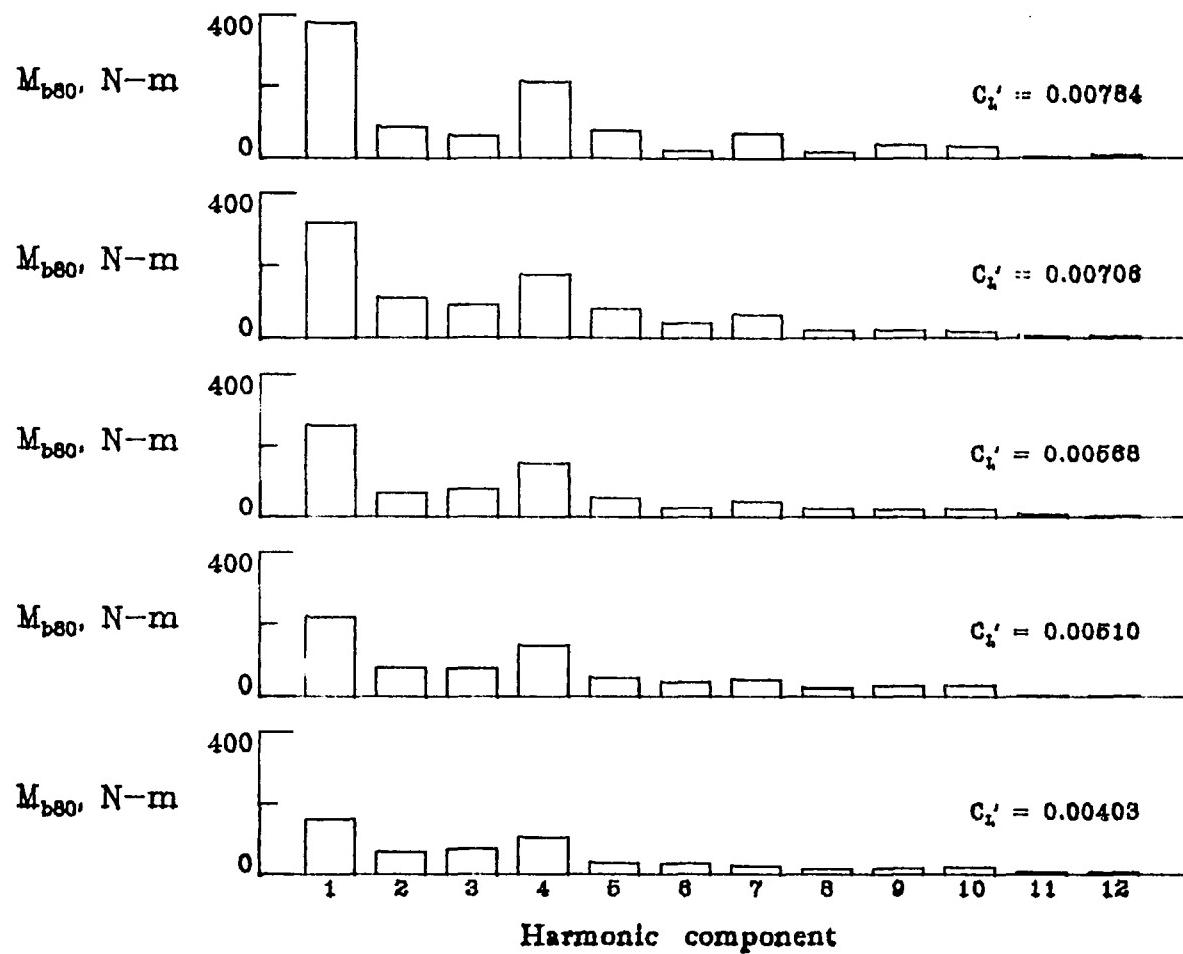
(c)  $M_{b45}$

Figure 12.- Continued.



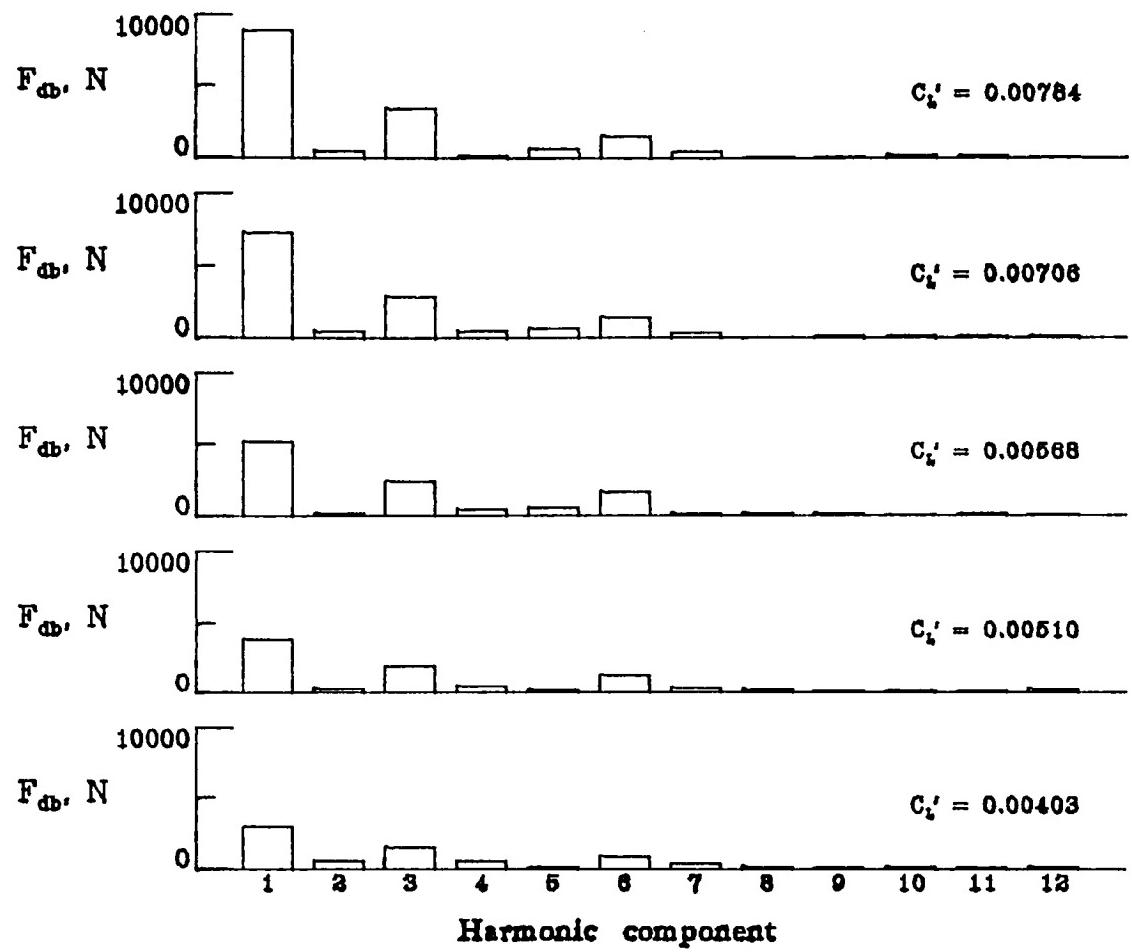
(d)  $M_{b61}$

Figure 12.- Continued.



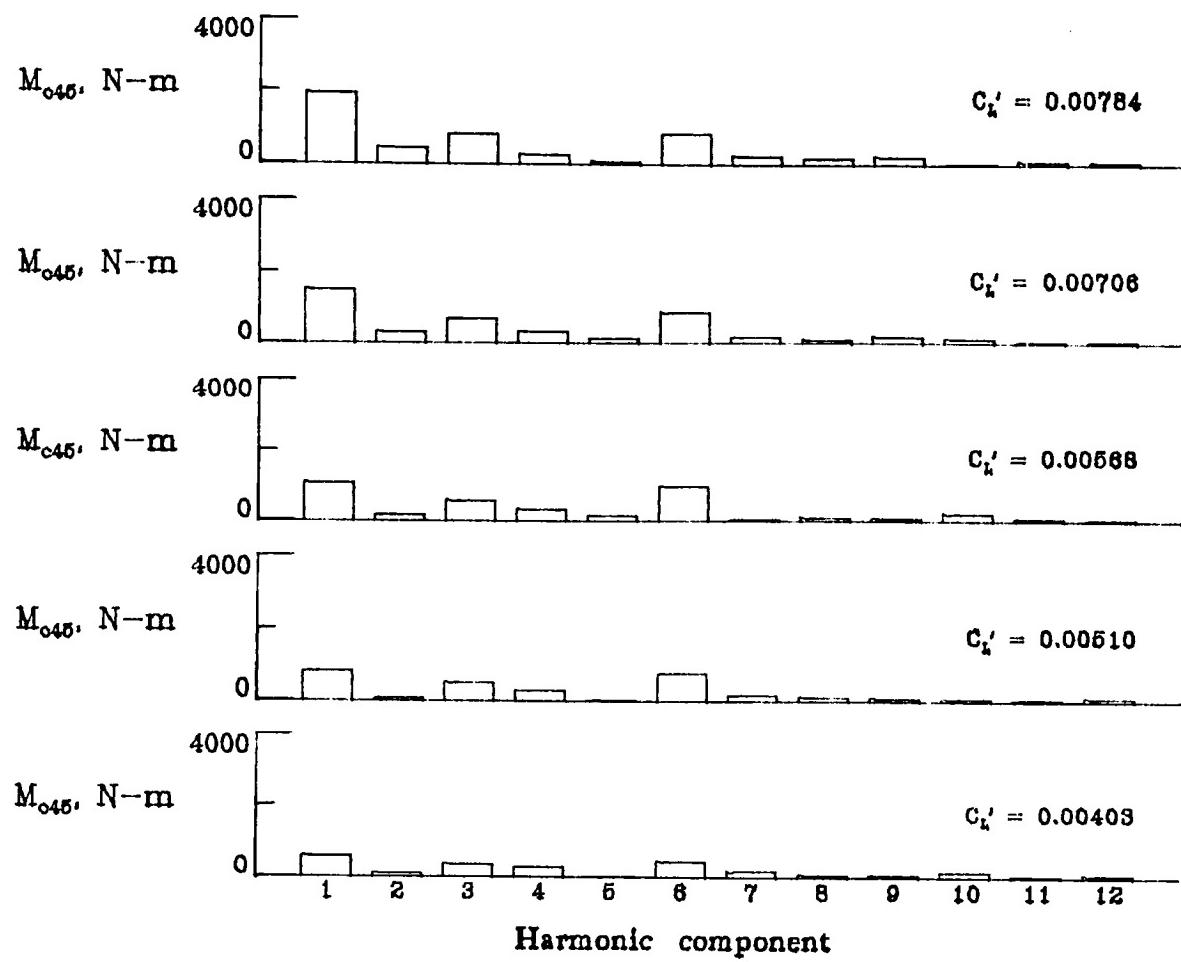
(e)  $M_{b80}$

Figure 12.- Continued.



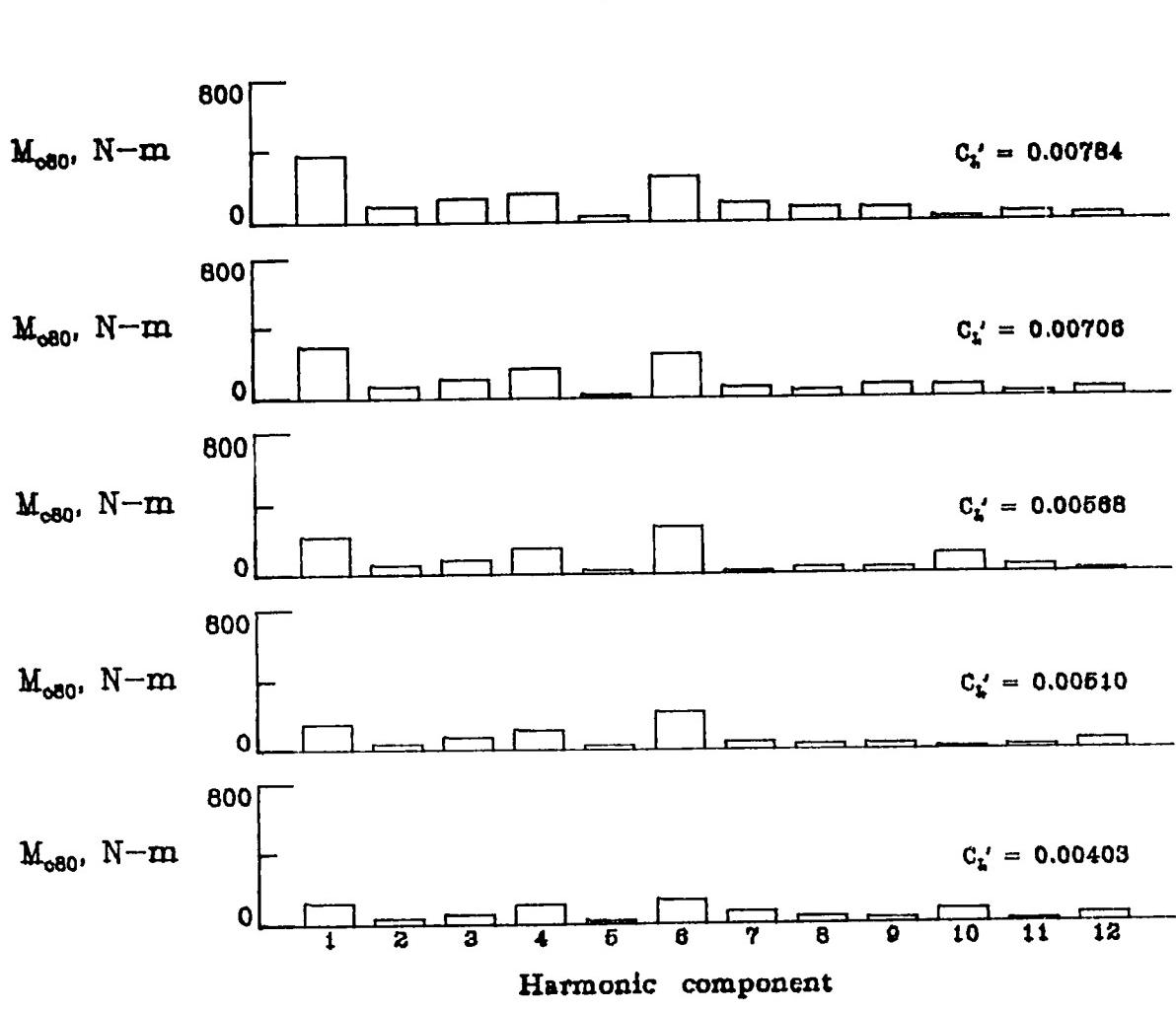
(f)  $F_{db}$

Figure 12.- Continued.



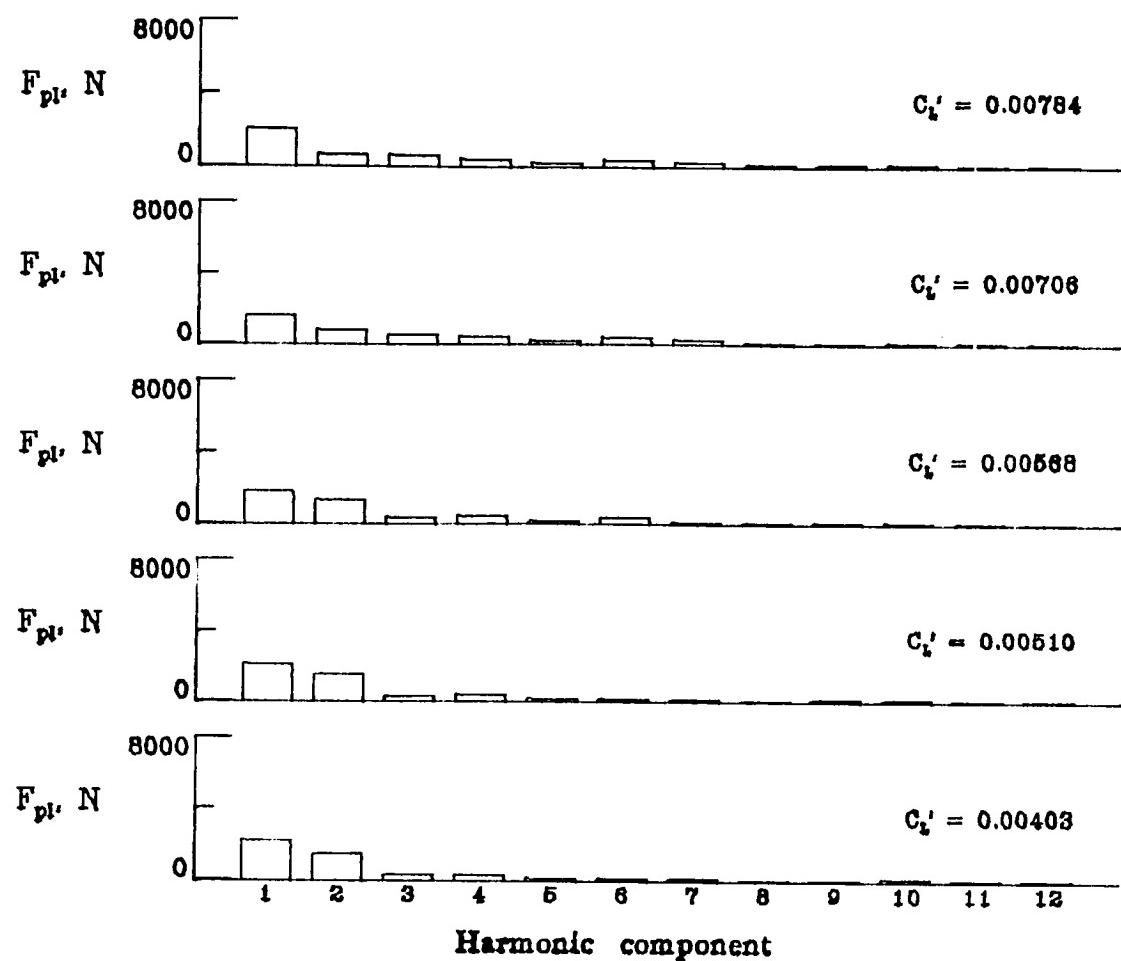
(g)  $M_{c45}$

Figure 12.- Continued.



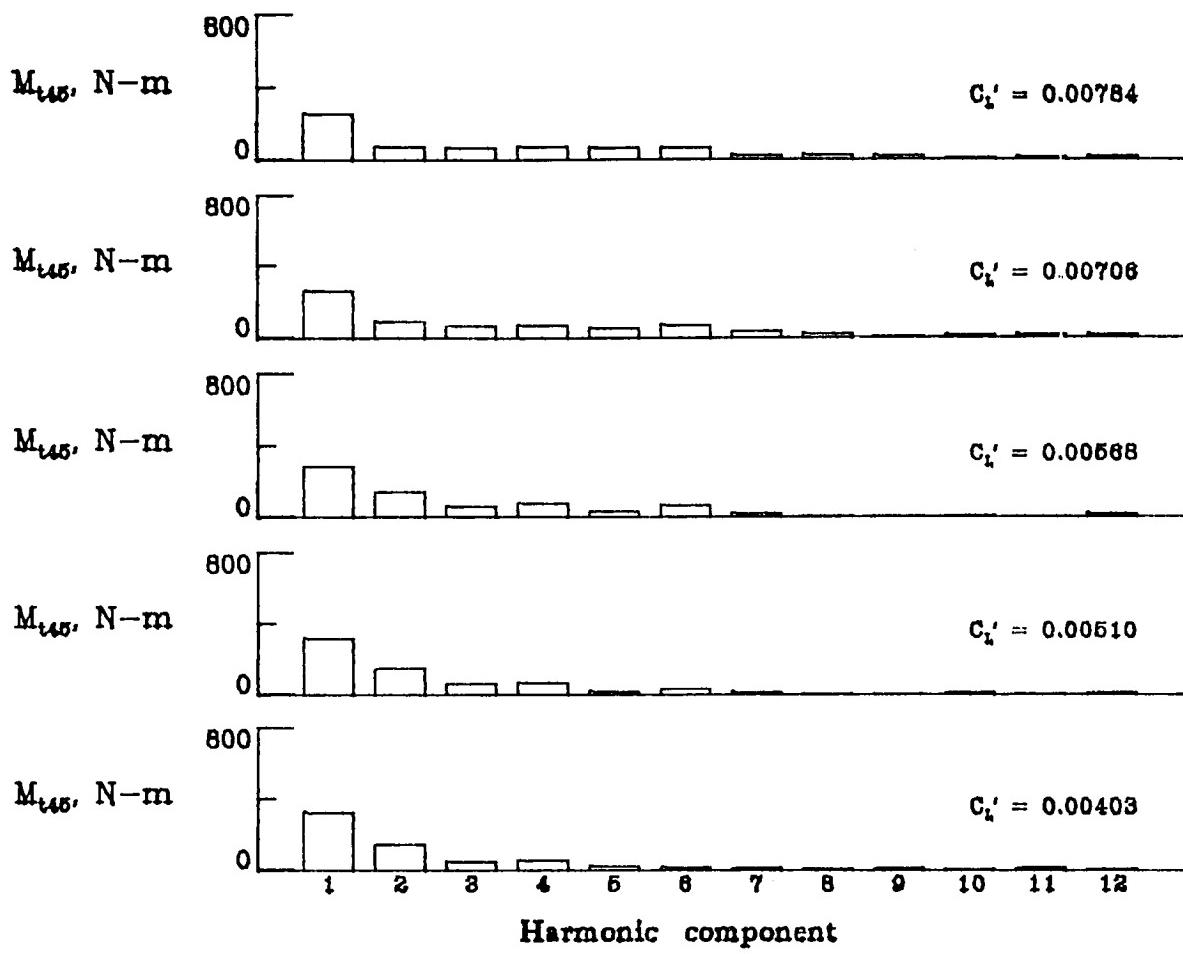
(h)  $M_{c80}$

Figure 12.- Continued.



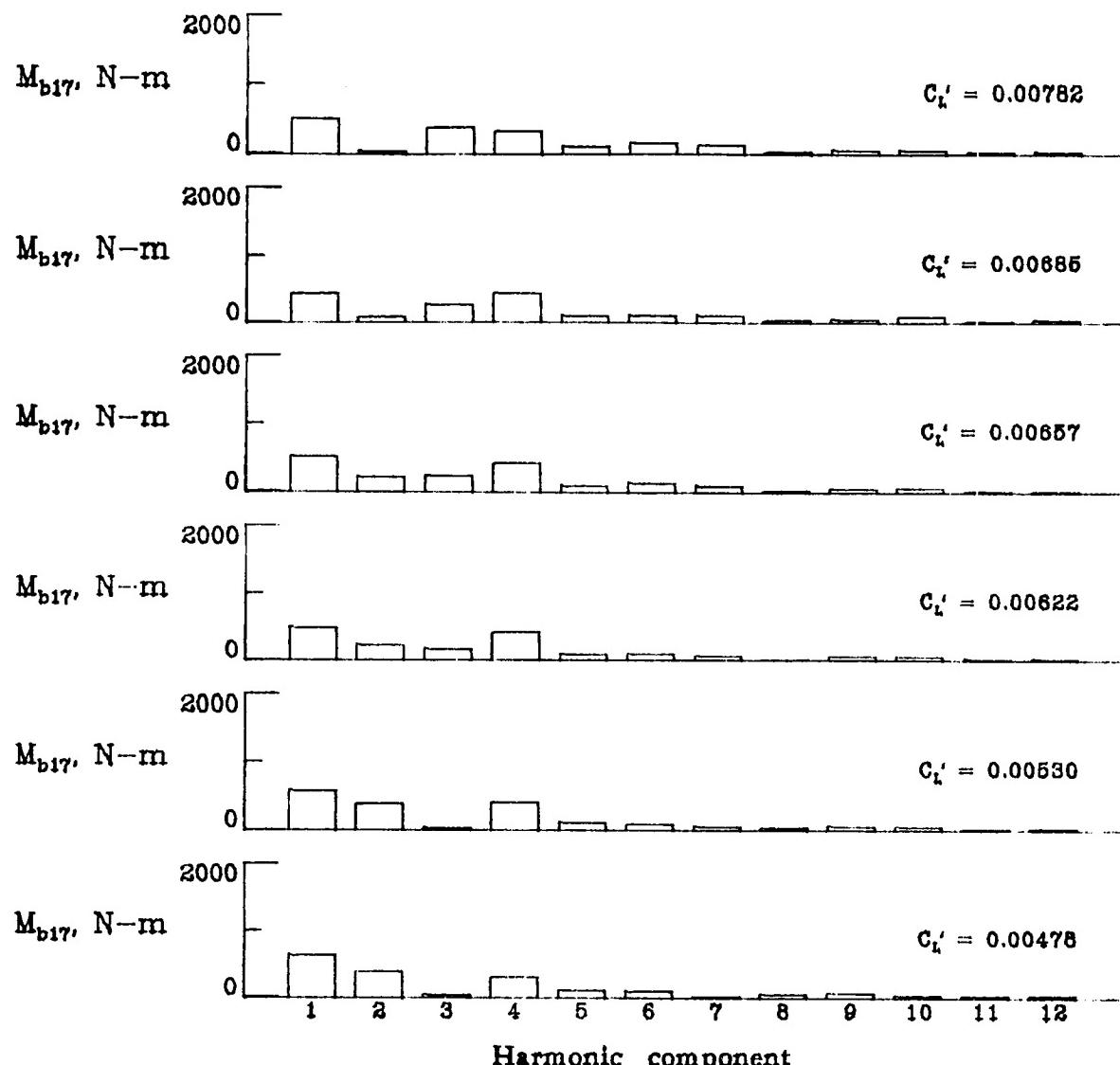
(i)  $F_{p1}$

Figure 12.- Continued.



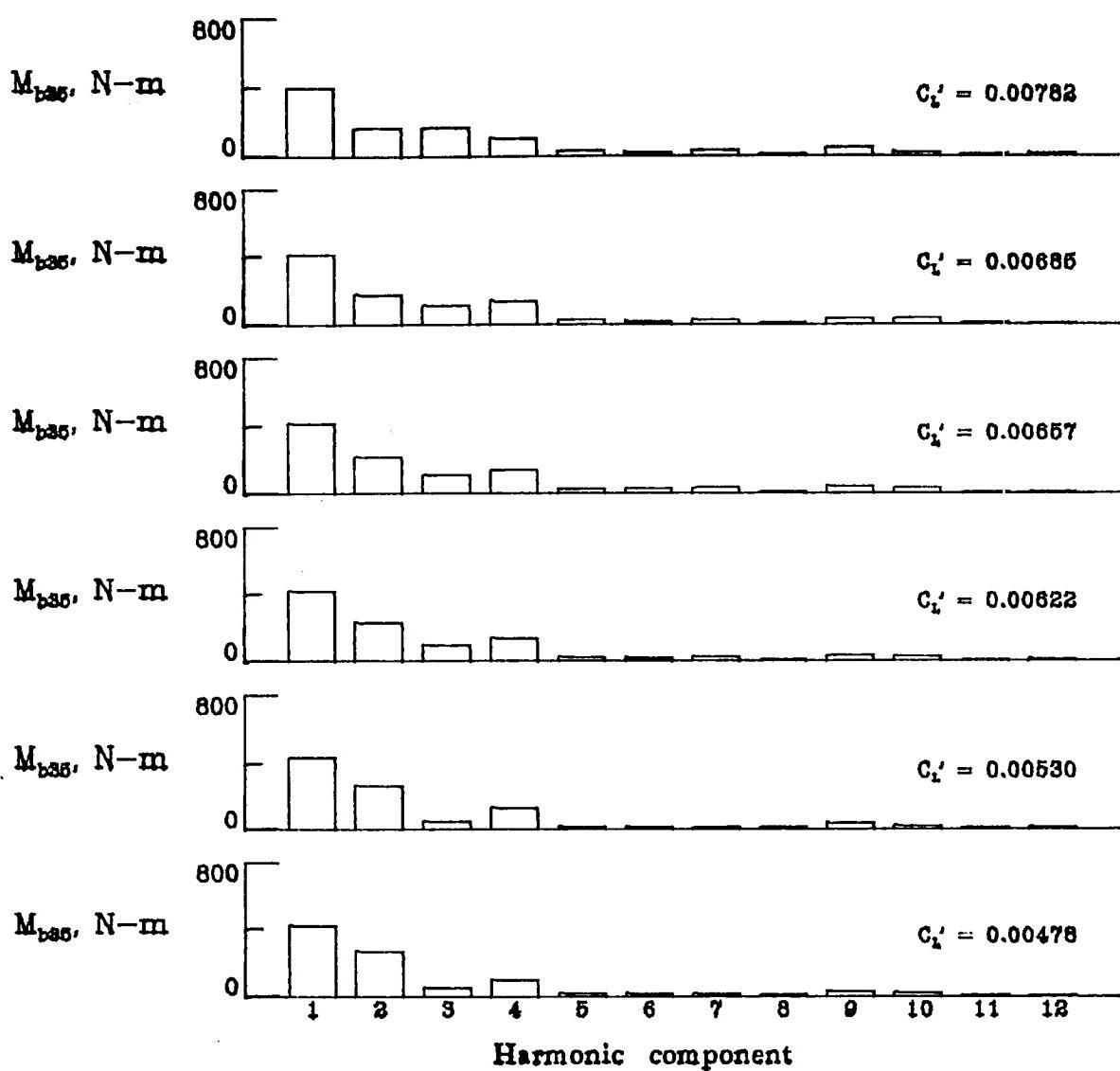
(j)  $M_{t45}$

Figure 12.- Concluded.



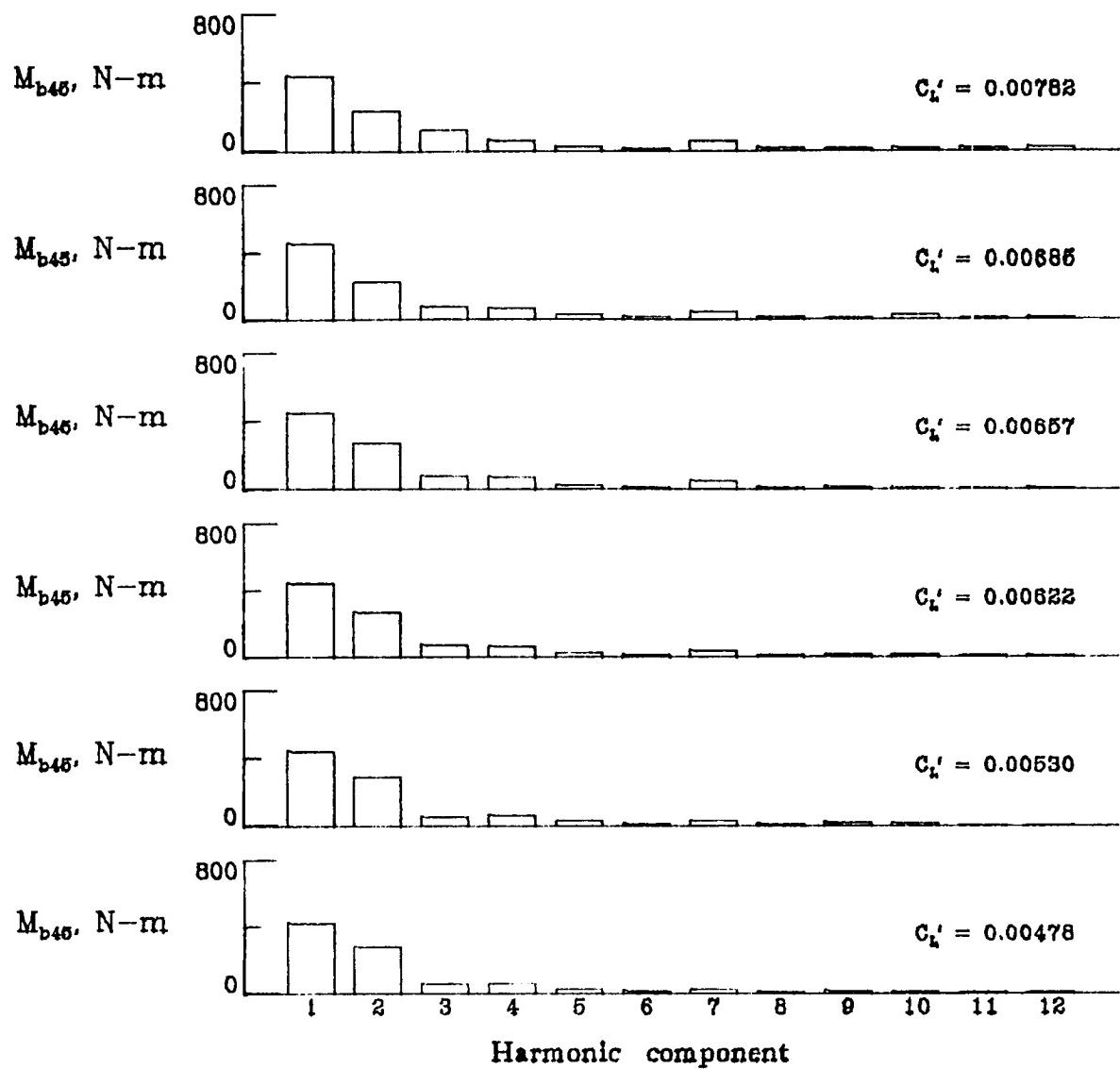
(a)  $M_{b17}$

Figure 13.- Harmonic content of rotor loads for descending right turns.  
 $\mu = 0.24$ .



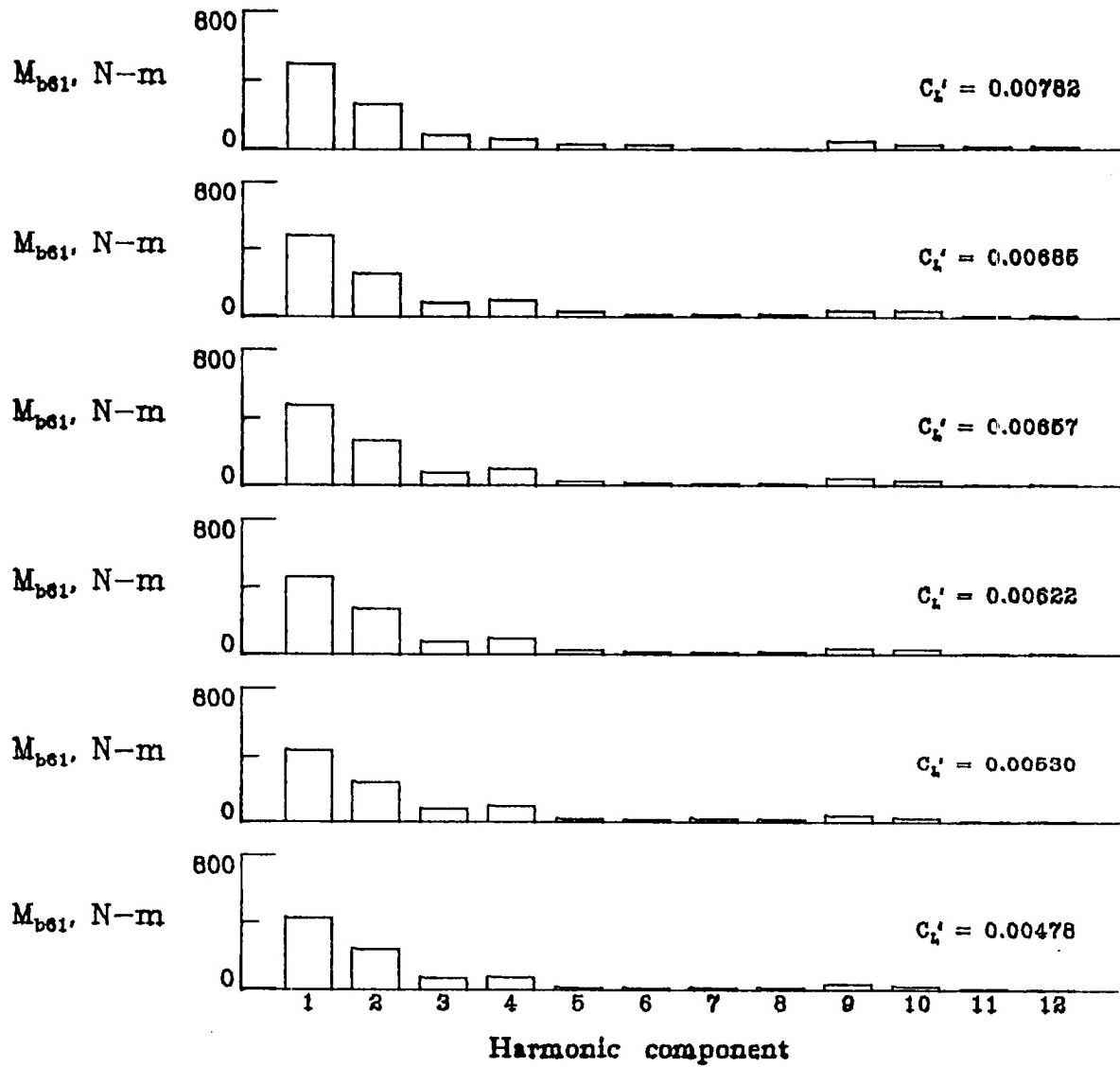
(b)  $M_{b35}$

Figure 13.- Continued.



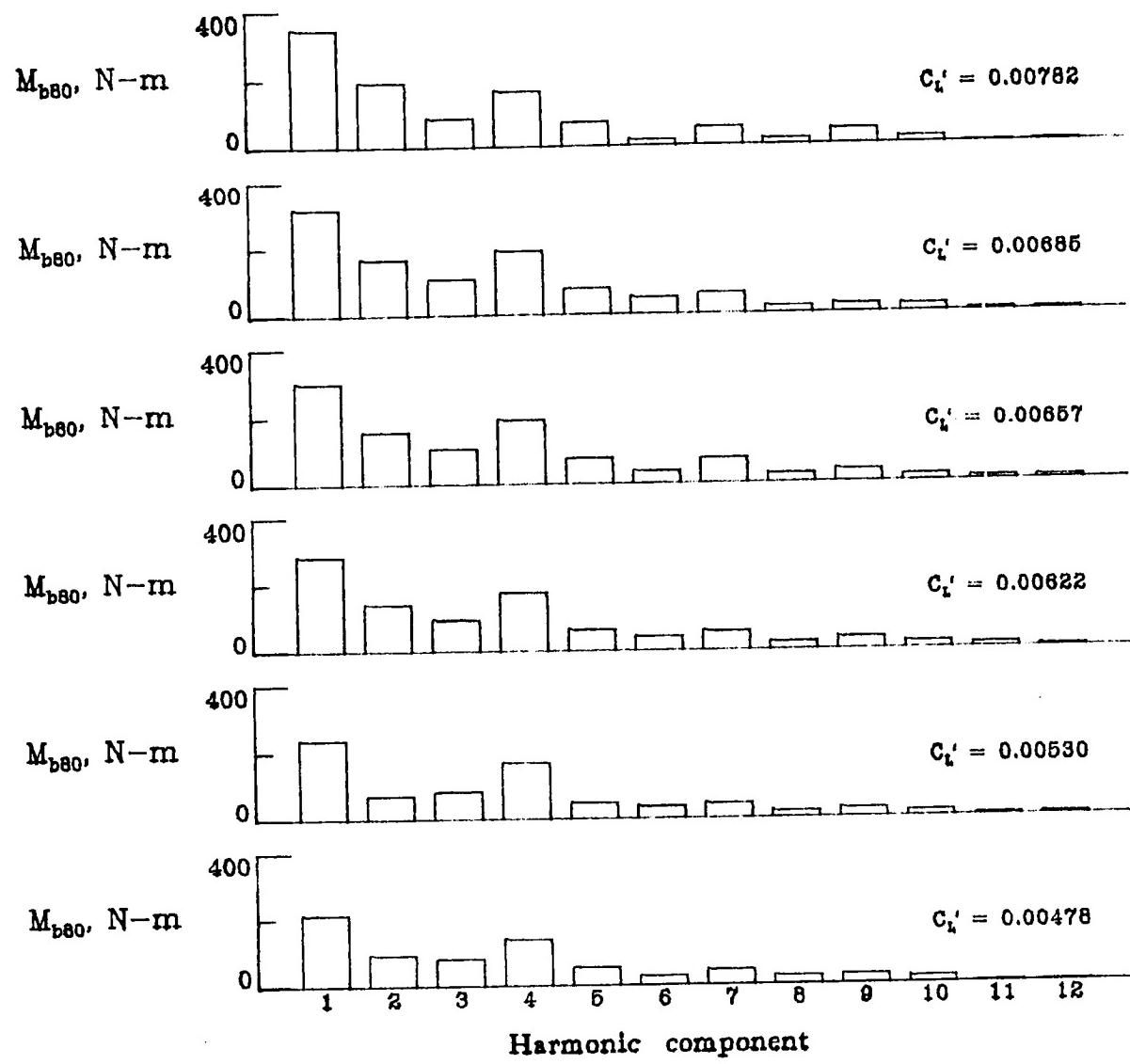
(c)  $M_{b45}$

Figure 13.- Continued.



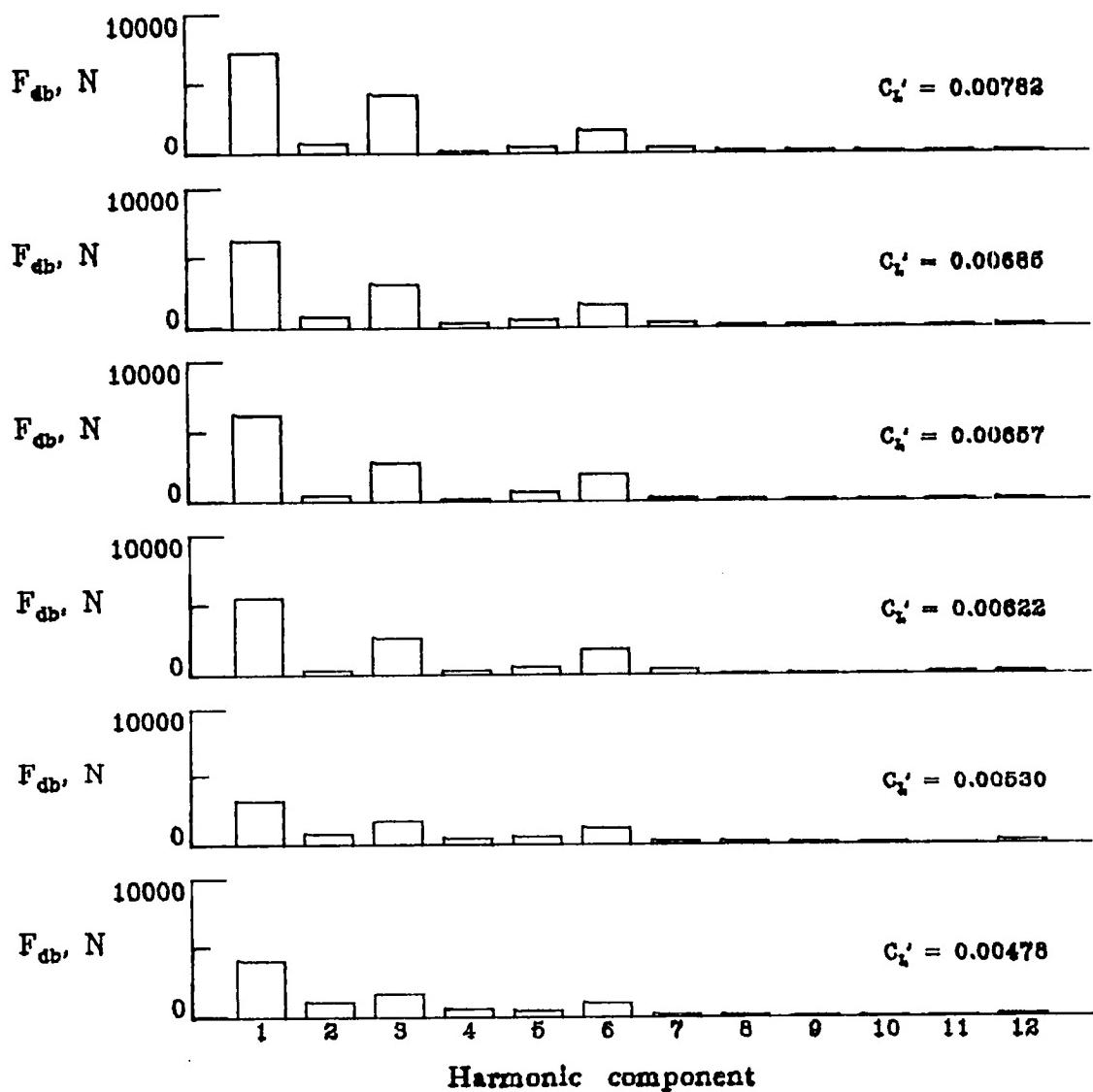
(d)  $M_{b61}$

Figure 13.- Continued.



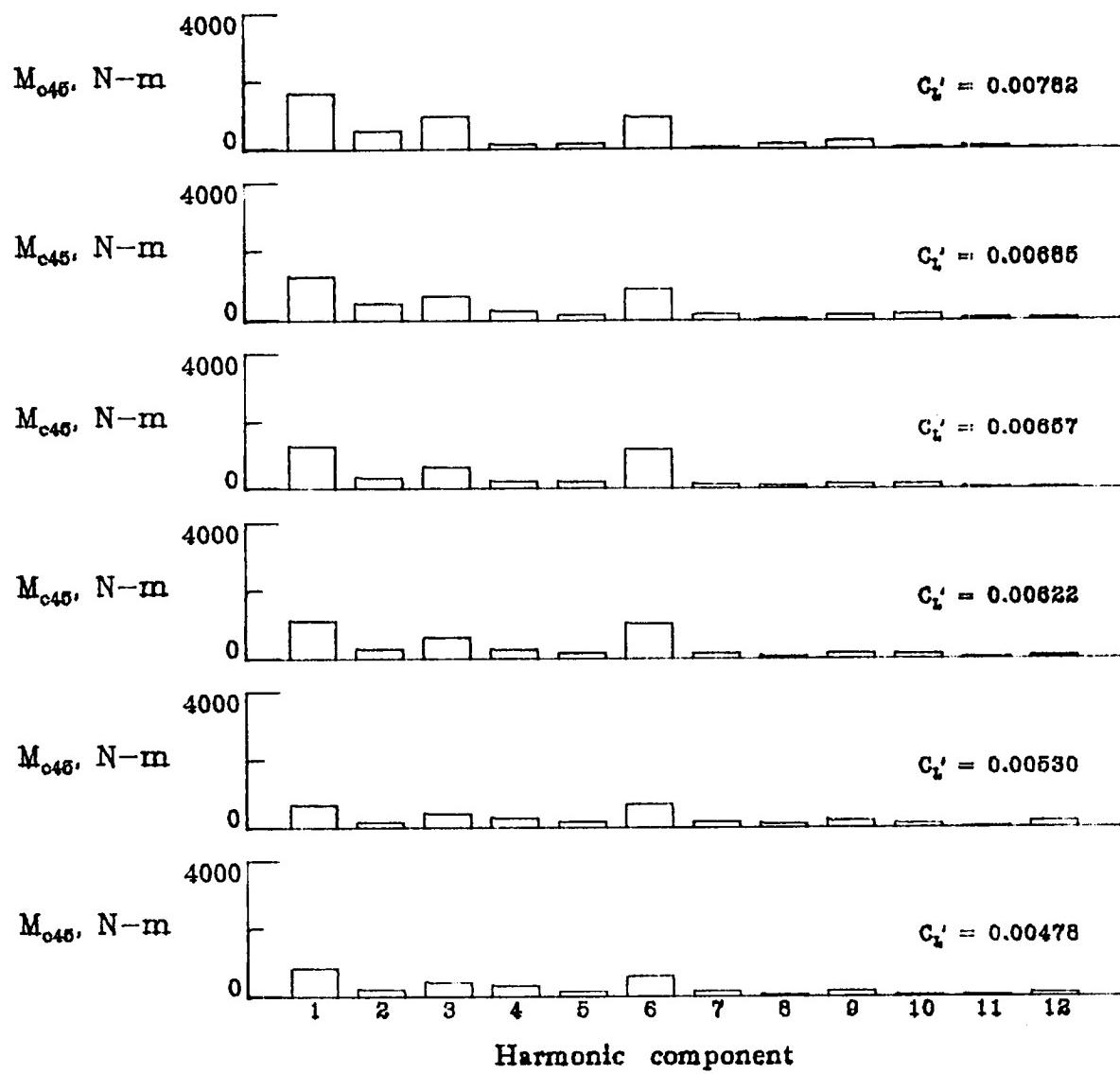
(e)  $M_{b80}$

Figure 13.- Continued.



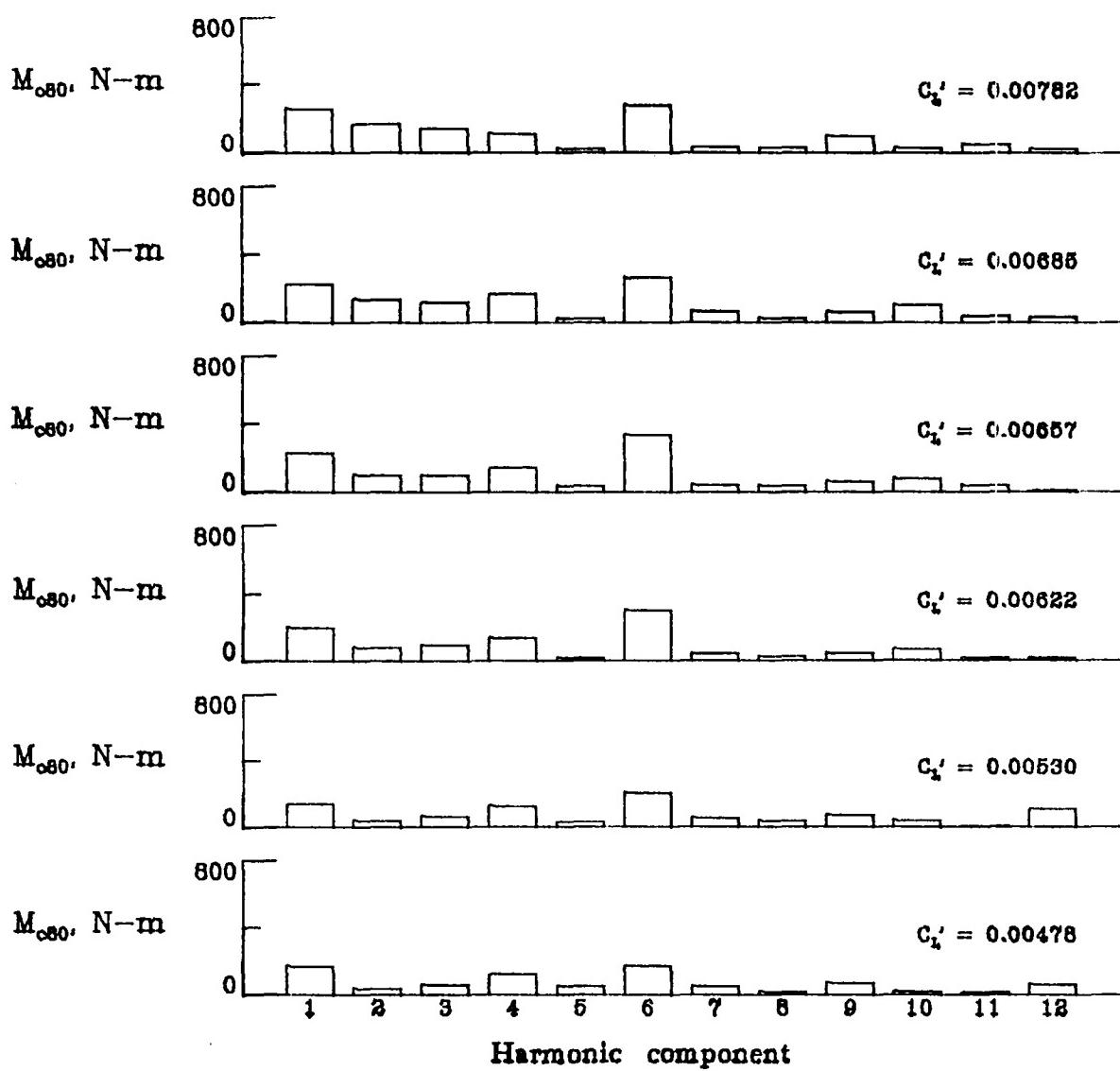
(f)  $F_{db}$

Figure 13.- Continued.



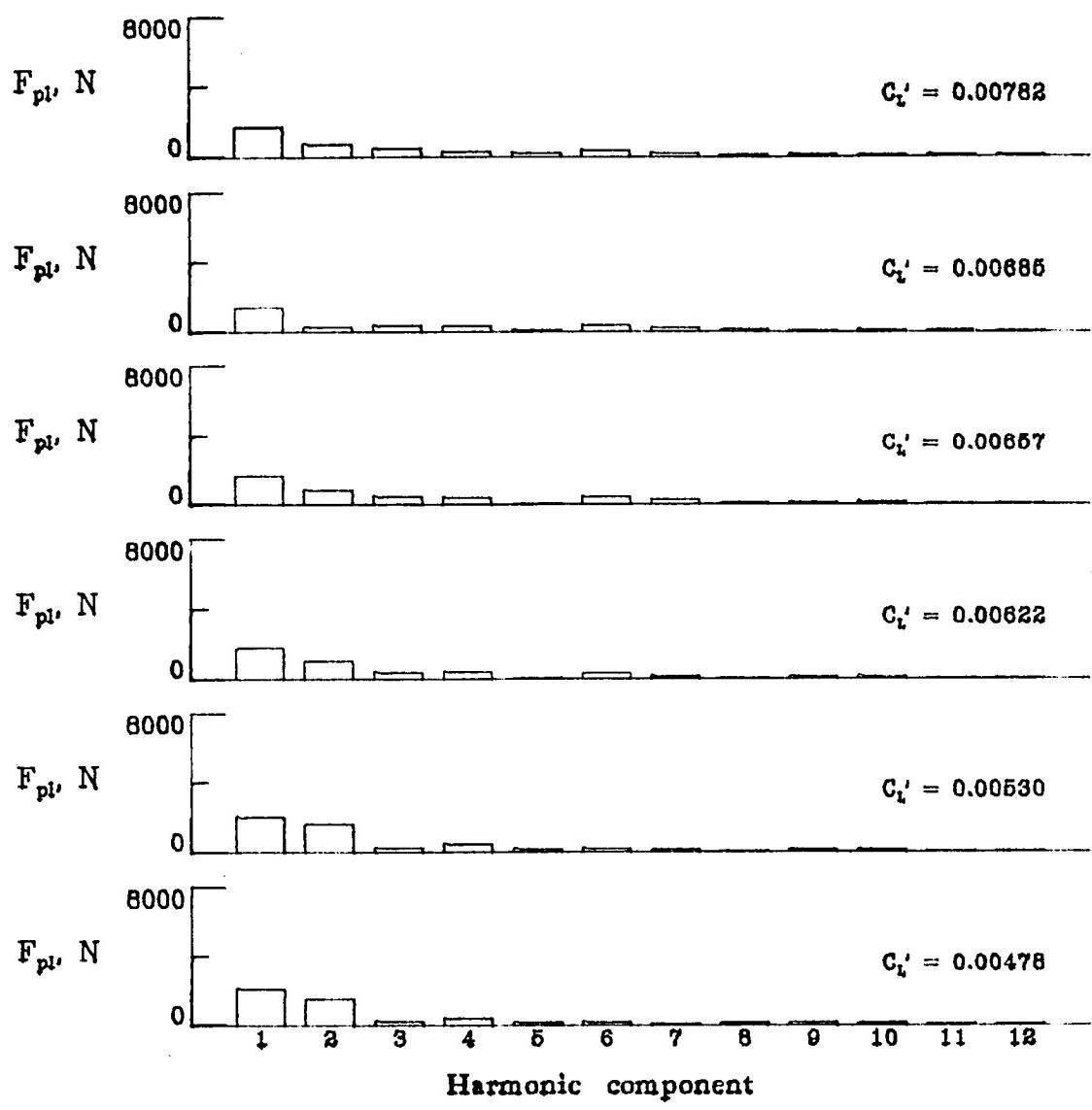
(g)  $M_{C45}$

Figure 13.- Continued.



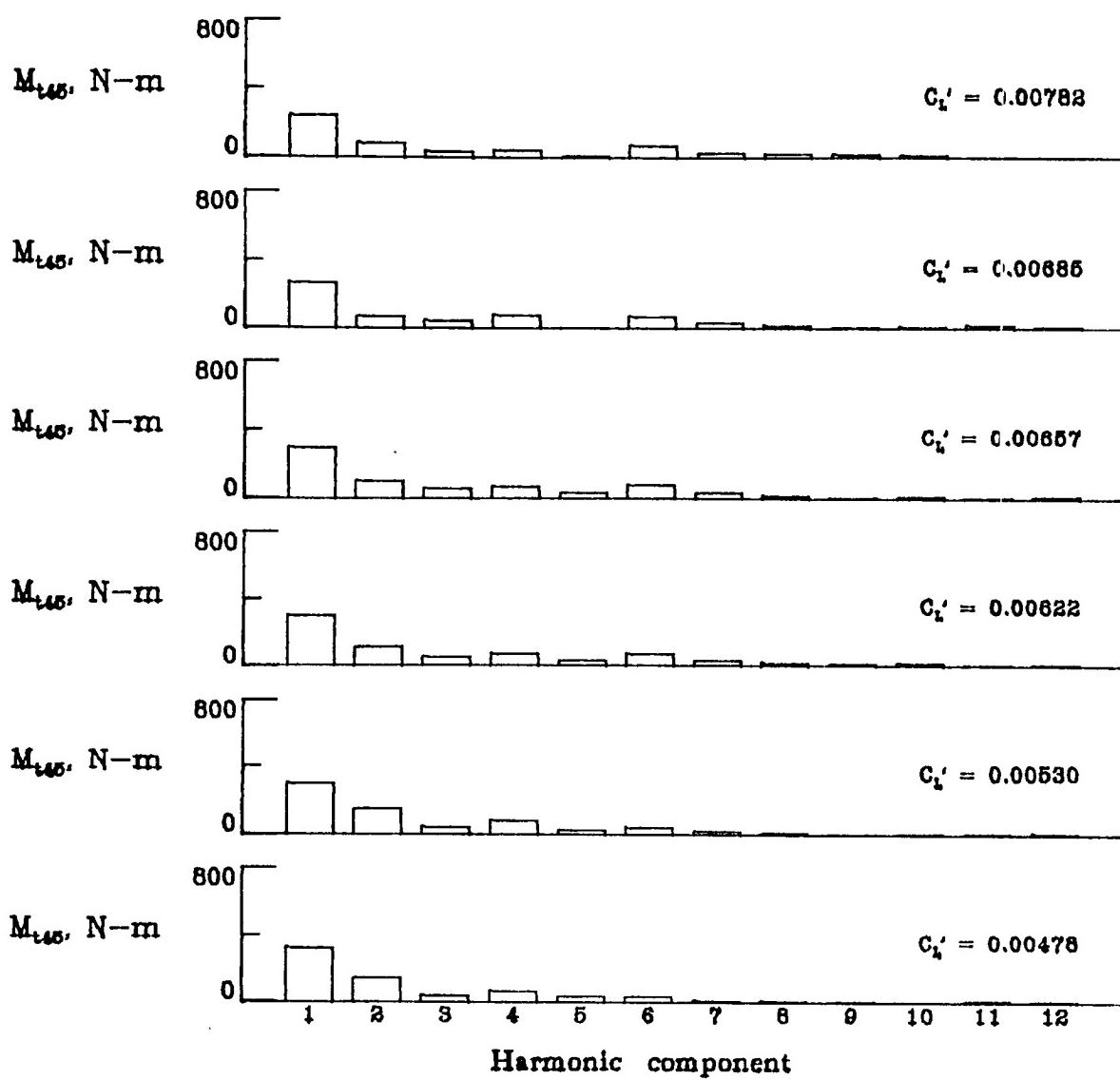
(h)  $M_{C80}$

Figure 13.- Continued.



(i)  $F_{p1}$

Figure 13.- Continued.



(j)  $M_{t45}$

Figure 13.-Concluded.

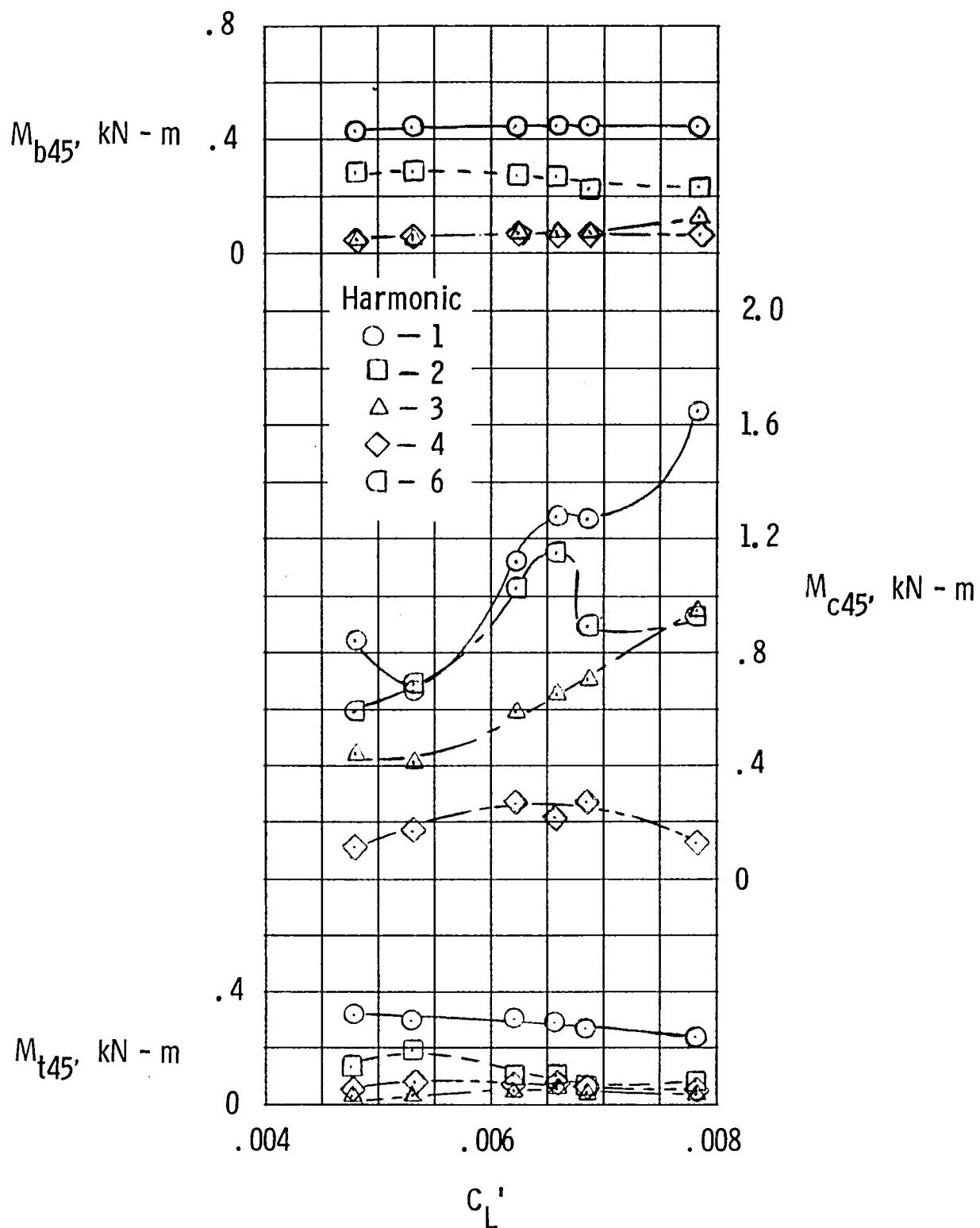
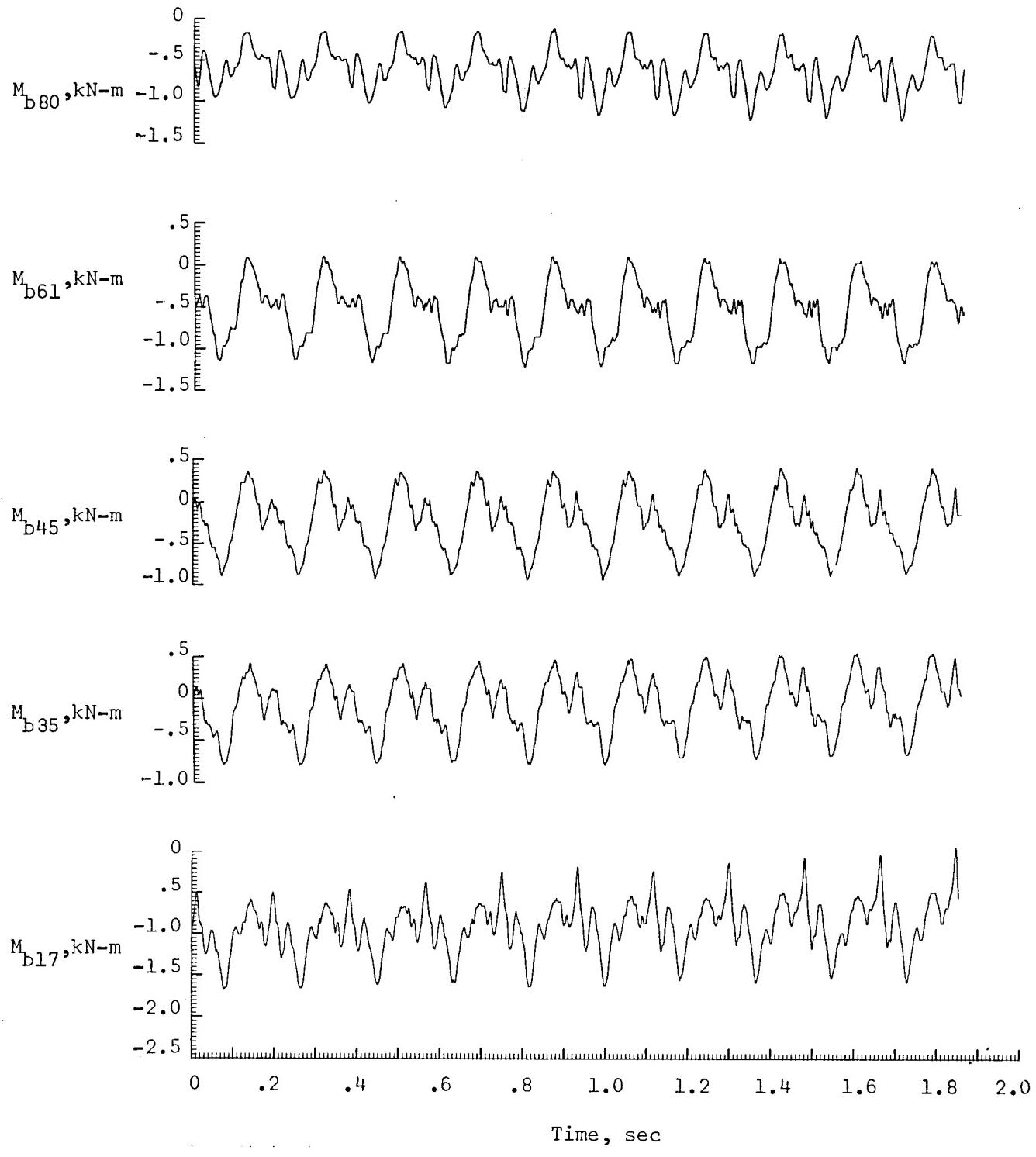
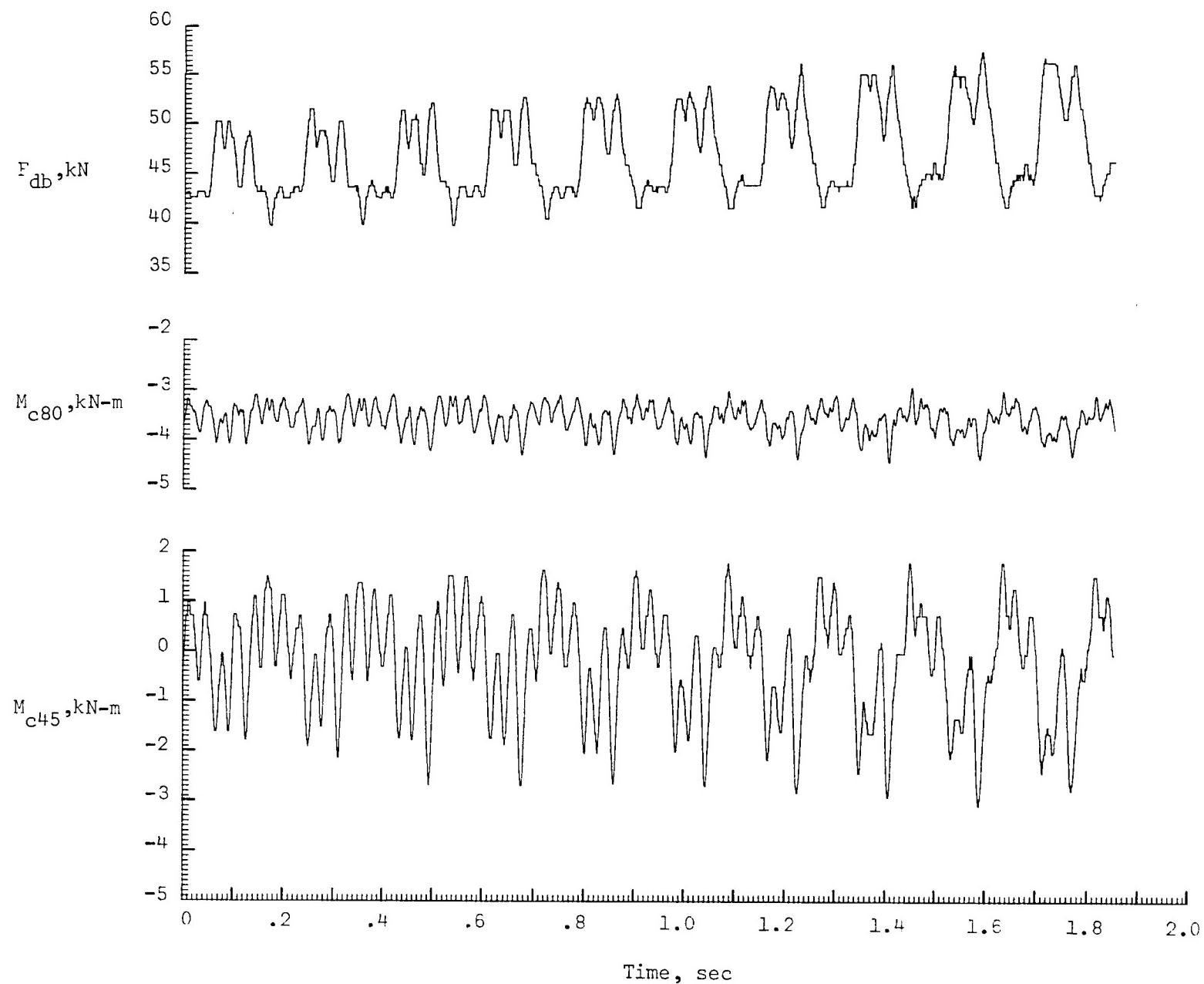


Figure 14. - Effect of vehicle load coefficient on primary harmonic-loads components for descending right turns.  $\bar{\mu} = 0.24$



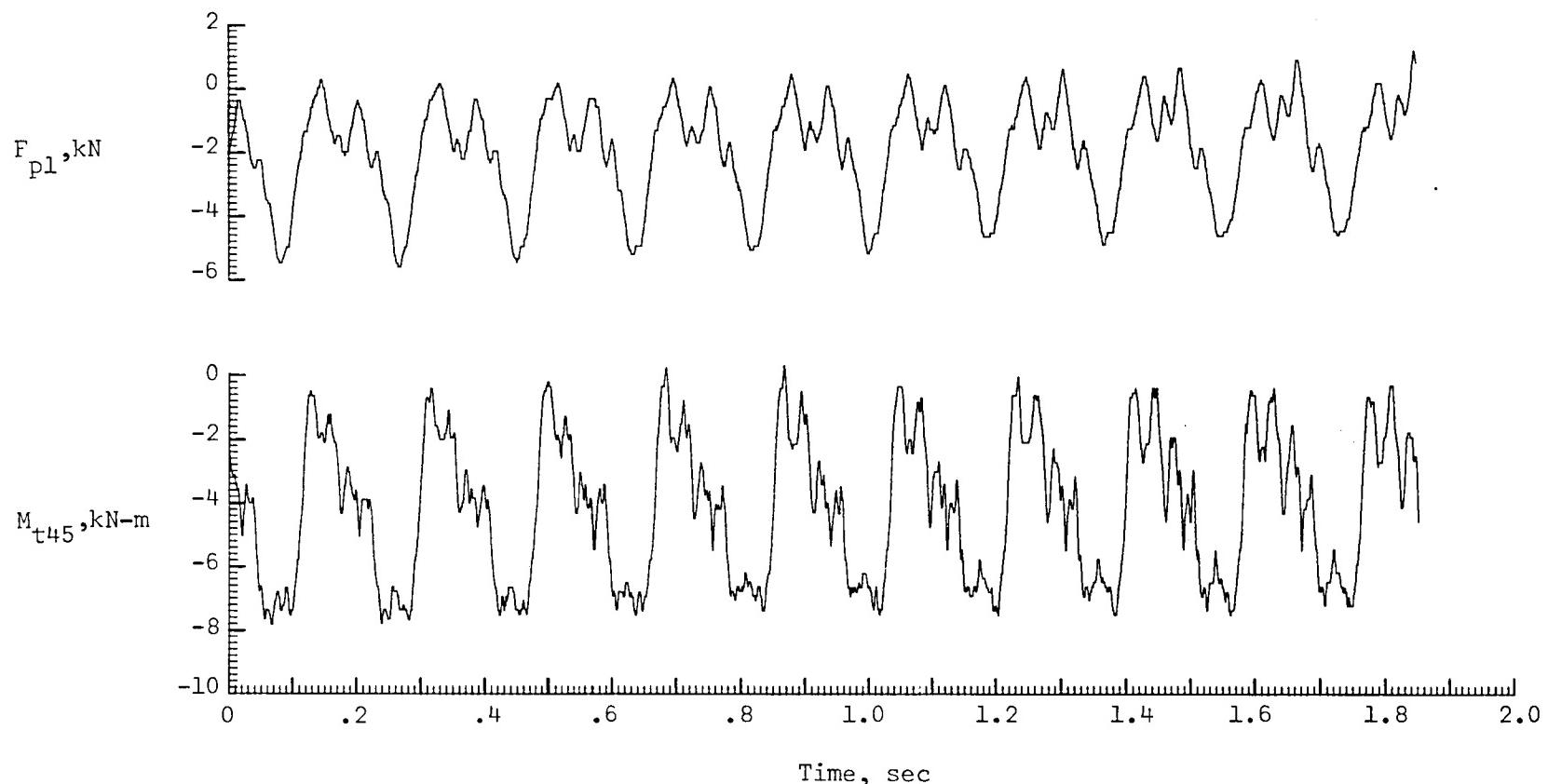
(a) Beamwise loads.

Figure 15. - Rotor-load histories for typical symmetrical pull-up  
(Flight 84, run 10 of Appendix A).  $\mu = 0.25$ ;  $C_L' = 0.0065$ .



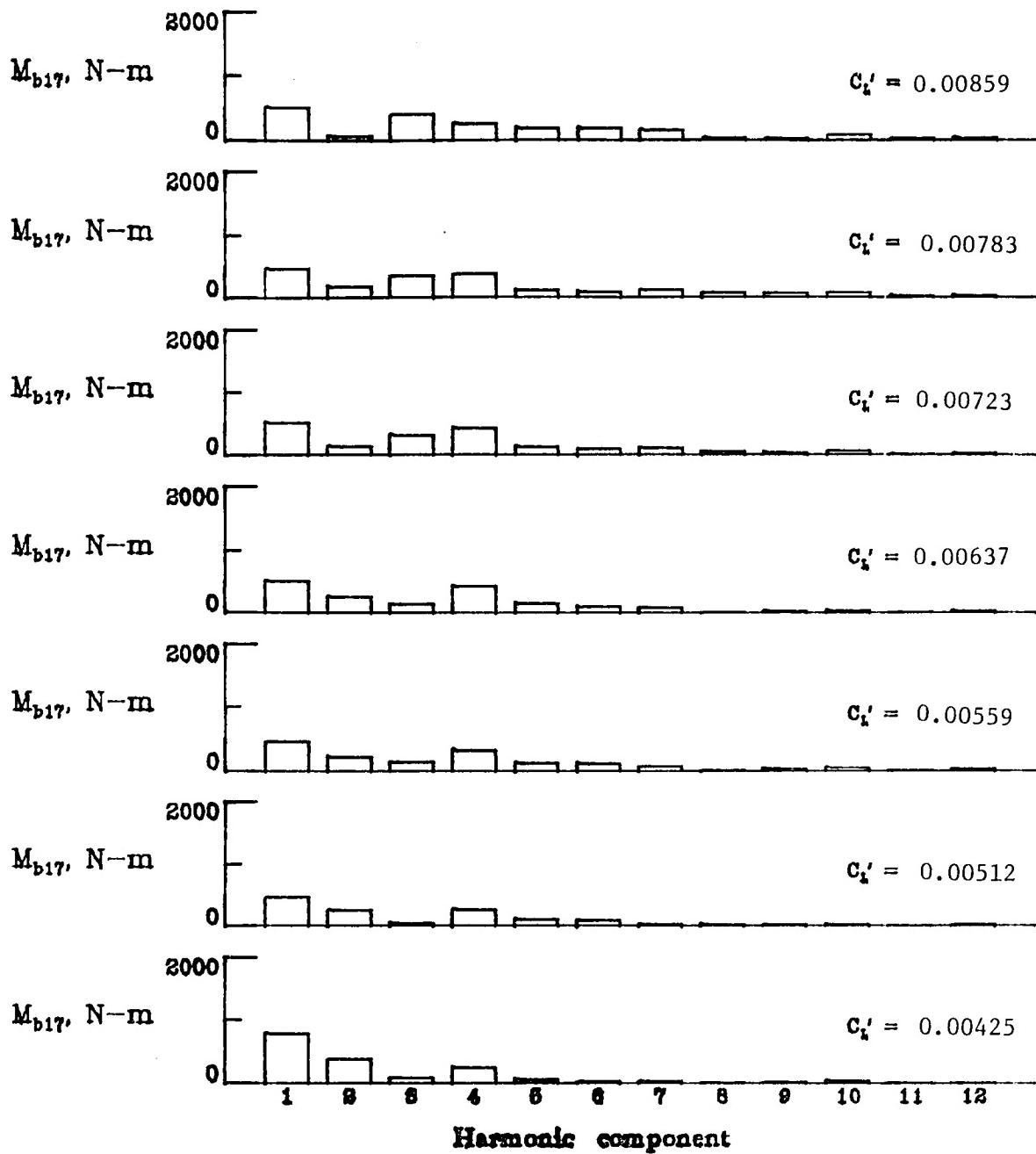
(b) Chordwise loads.

Figure 15.- Continued.



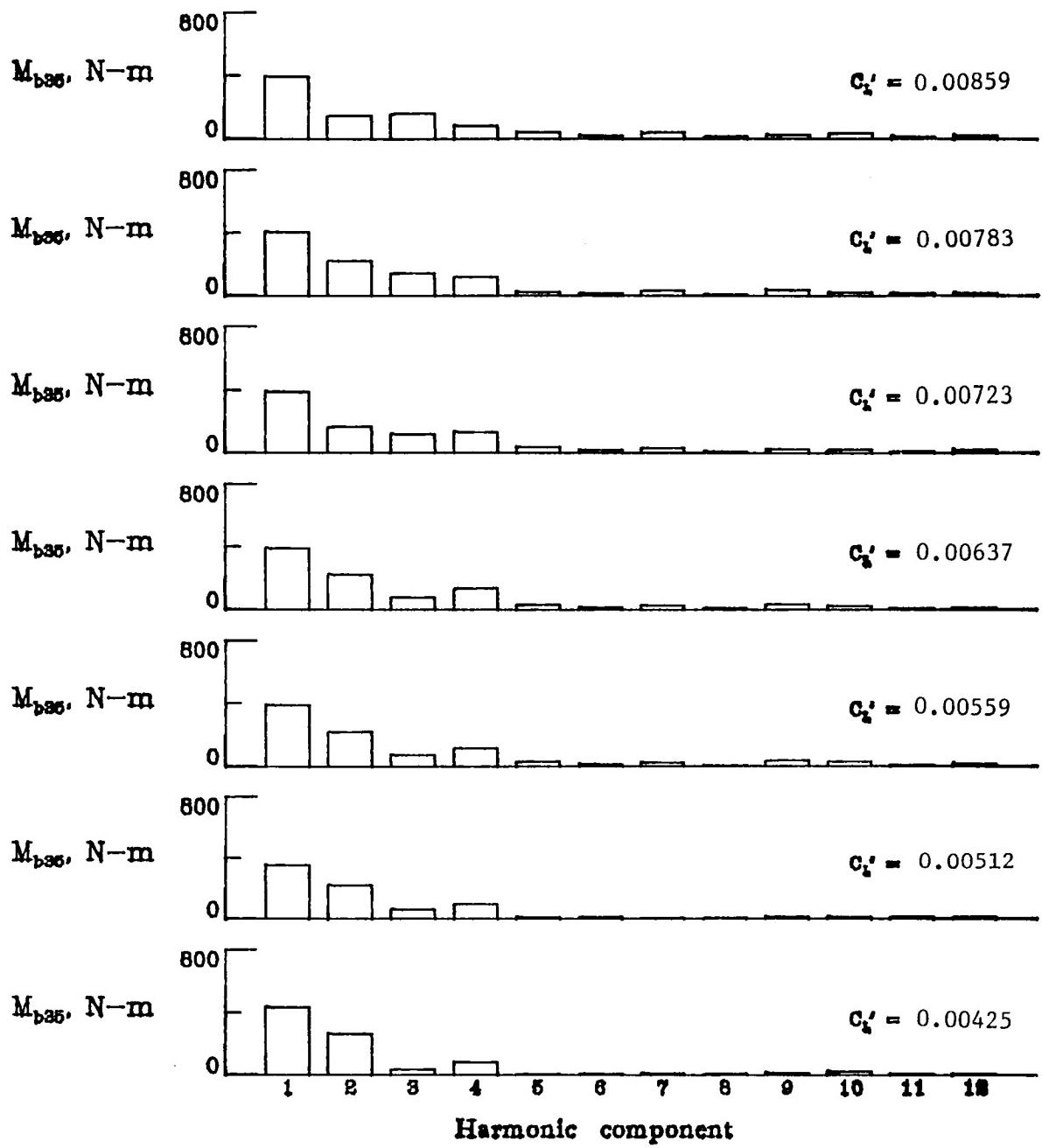
(c) Torsional loads.

Figure 15.- Concluded.



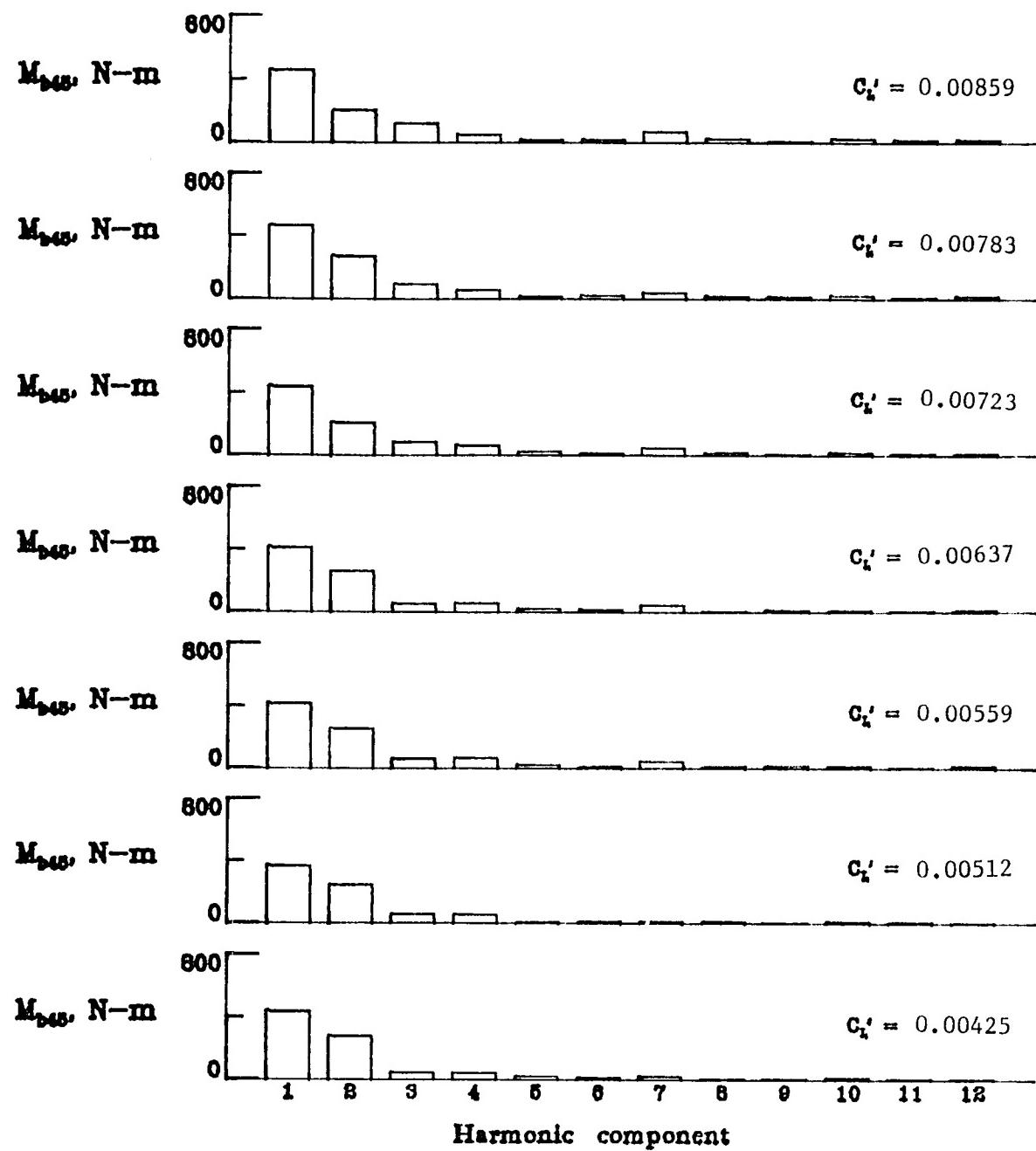
(a)  $M_{b17}$

Figure 16. - Harmonic content of rotor loads for symmetrical pull-ups.  
 $\mu = 0.25$ .



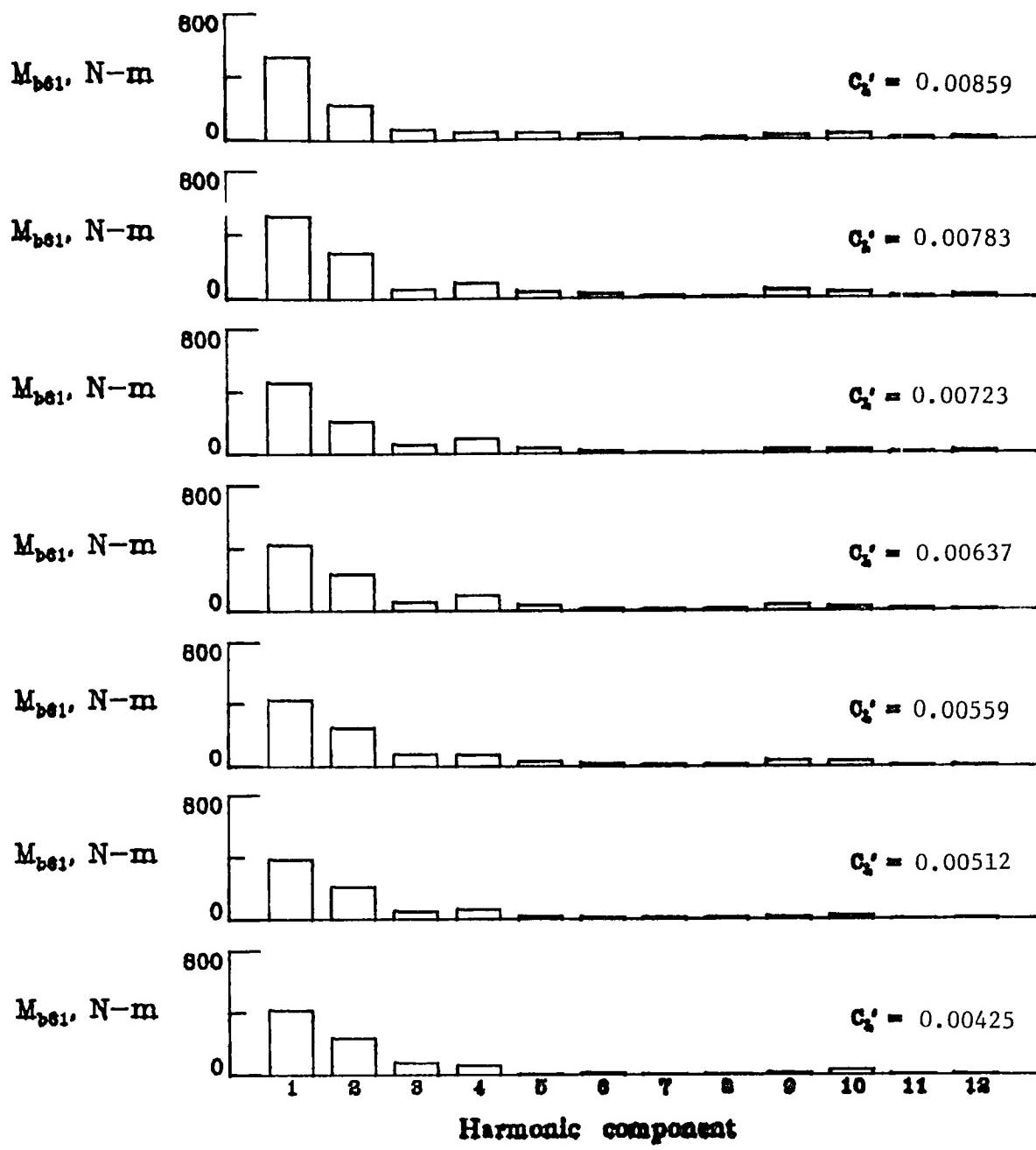
(b)  $M_{b35}$

Figure 16.- Continued.



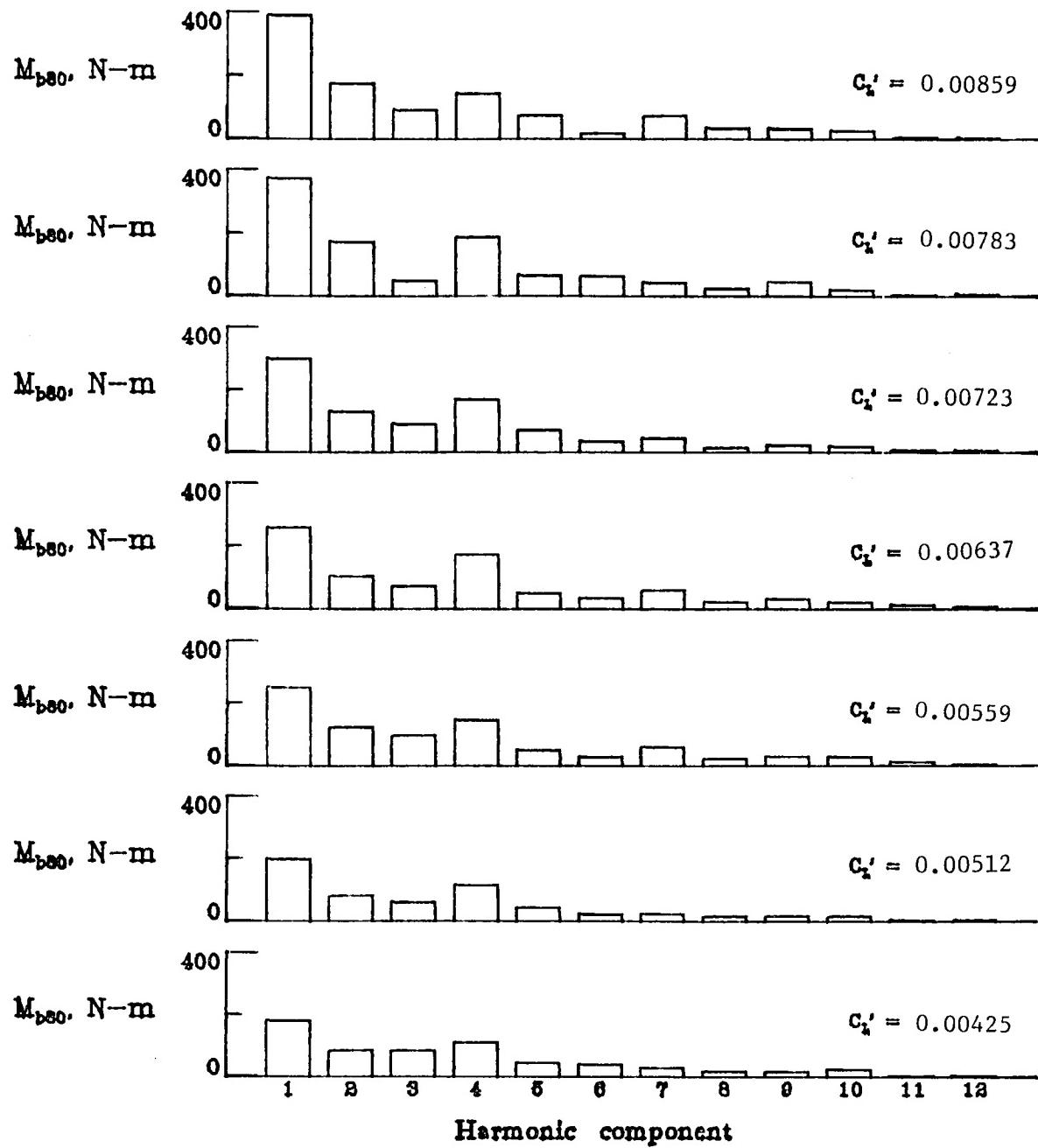
(c)  $M_{b45}$

Figure 16.- Continued.



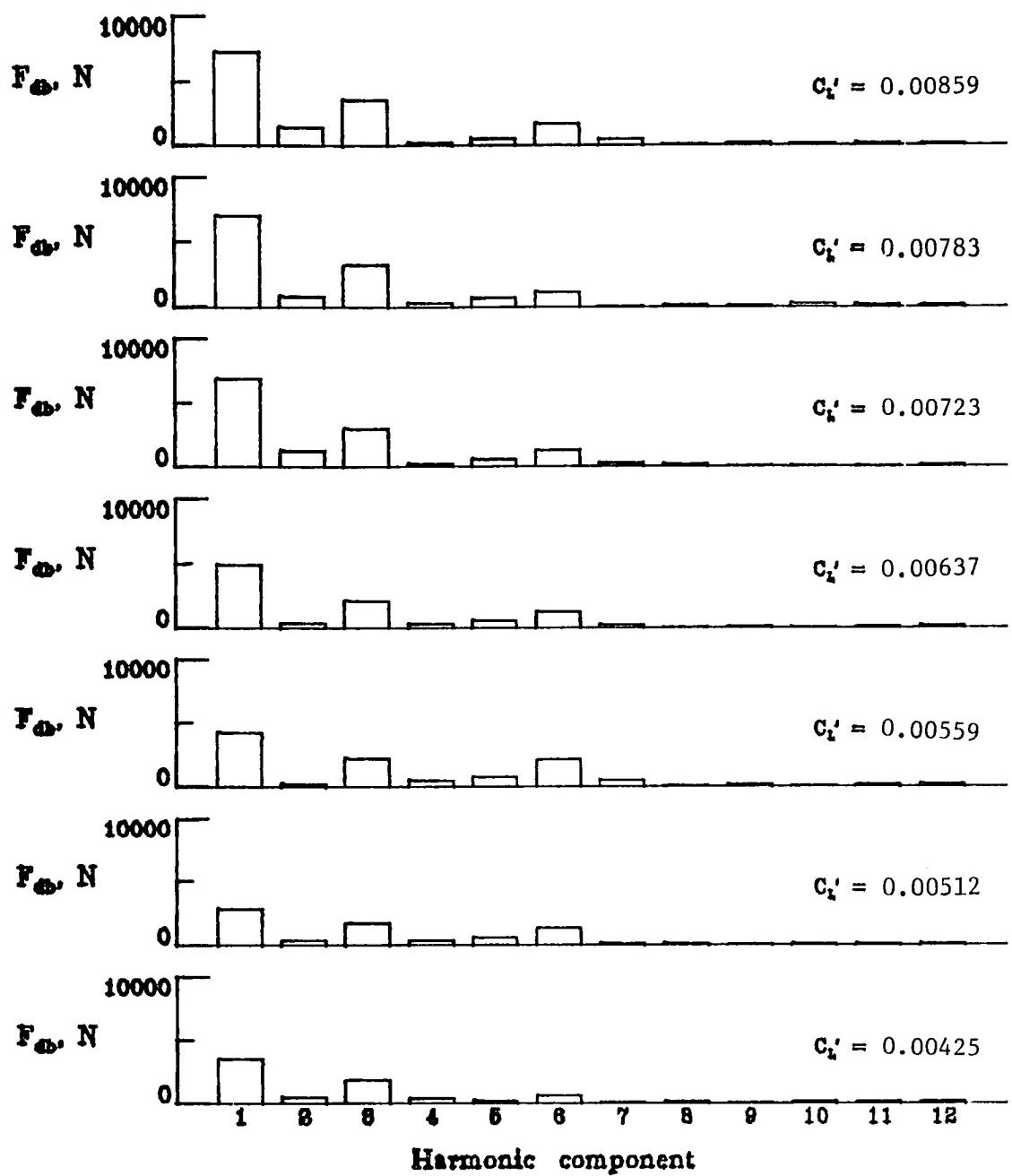
(d)  $M_{b61}$

Figure 16.- Continued.



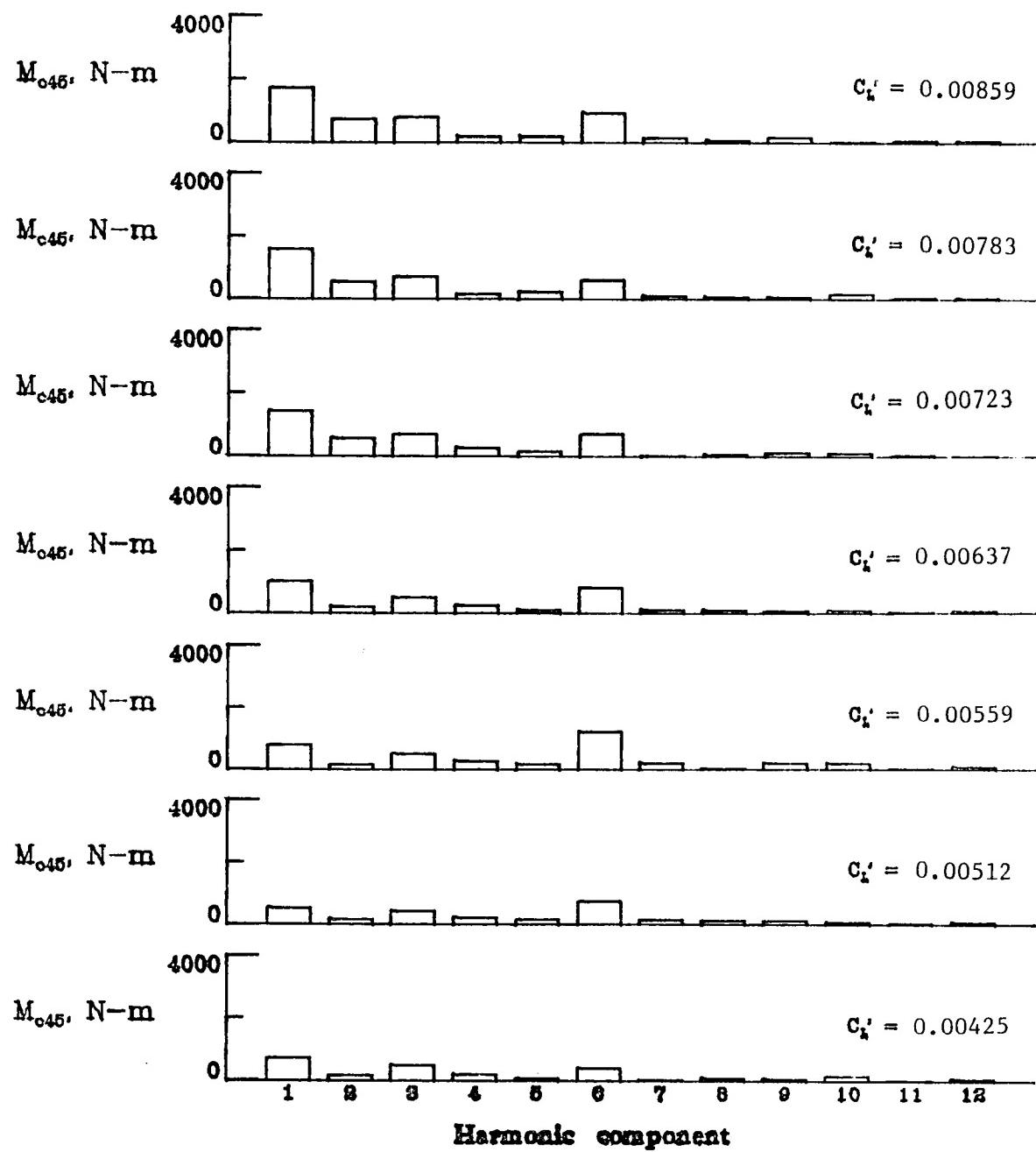
(e)  $M_{b80}$

Figure 16.- Continued.



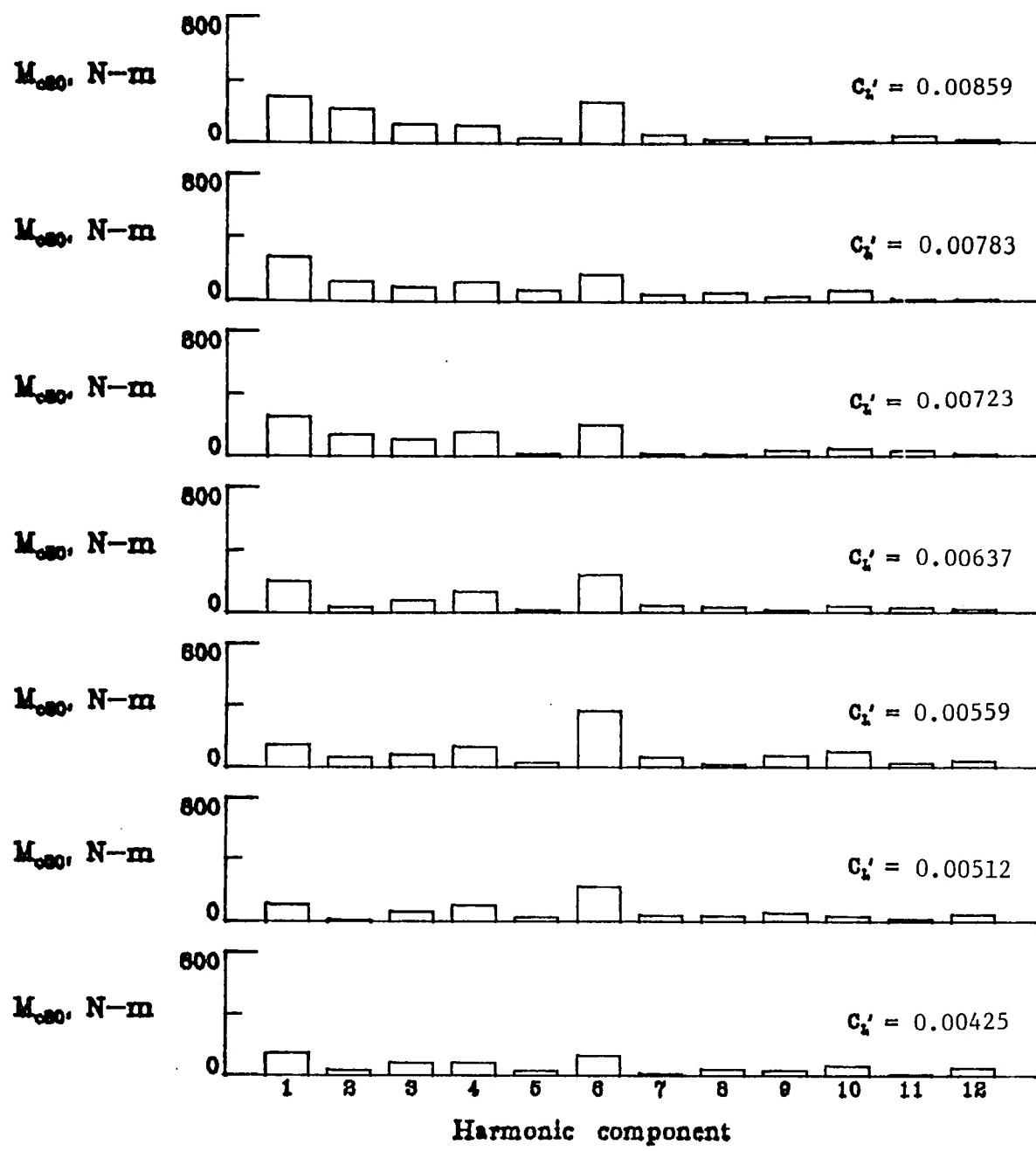
(f)  $F_{db}$

Figure 16.- Continued.



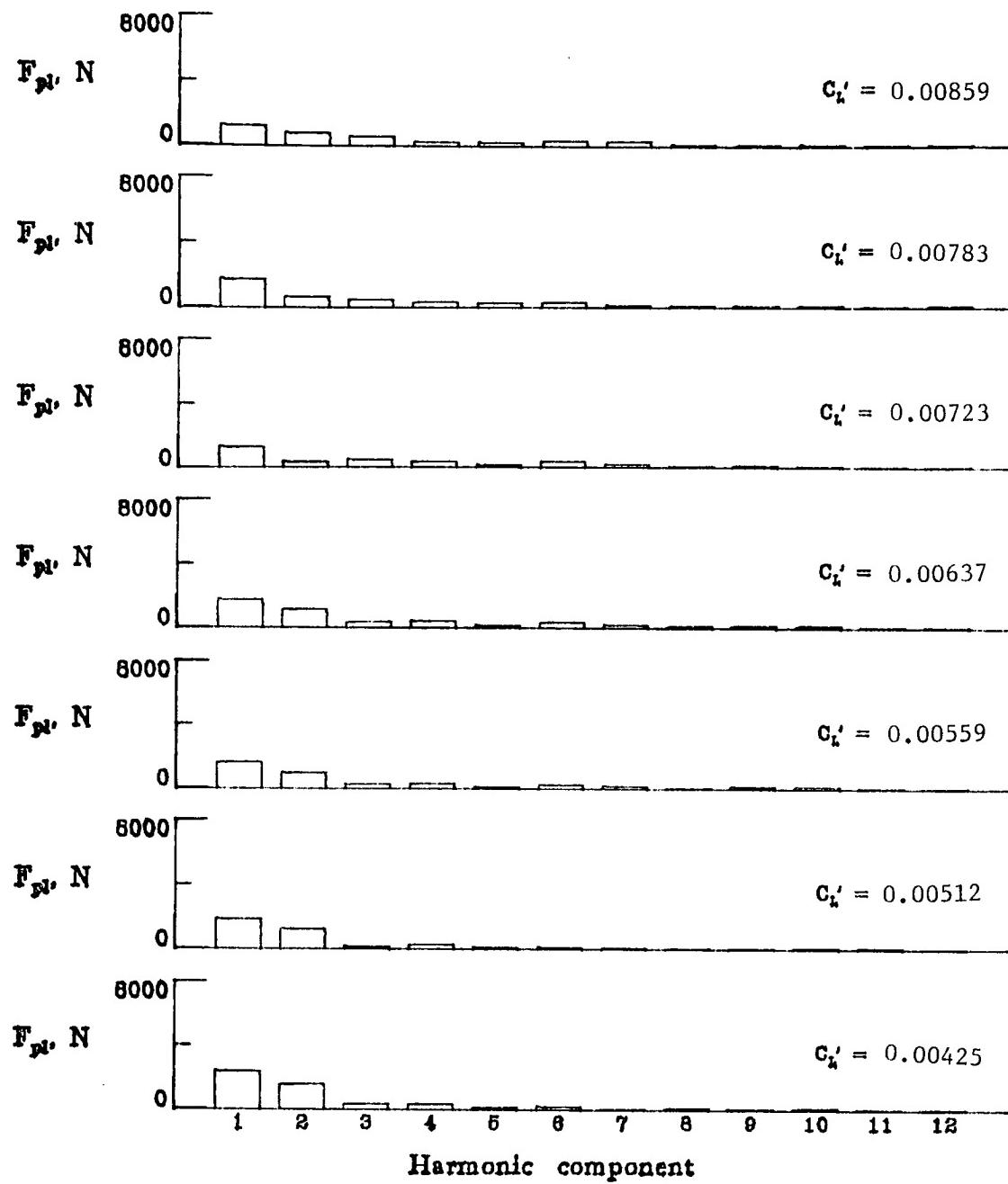
(g)  $M_{C45}$

Figure 16.- Continued.



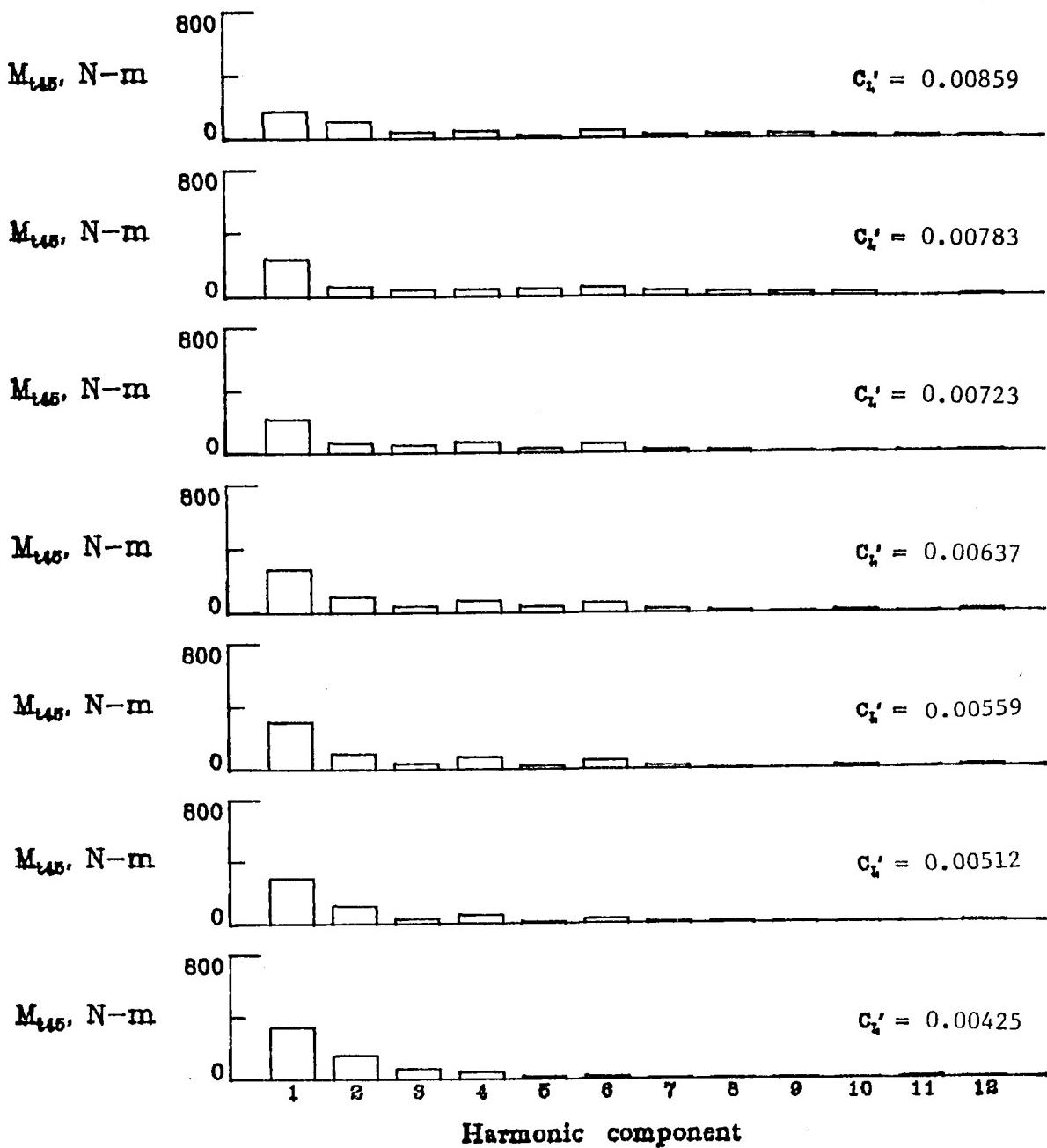
(h)  $M_{c80}$

Figure 16.- Continued.



(i)  $F_{p1}$

Figure 16.- Continued.



(j)  $M_{t45}$

Figure 16.- Concluded.

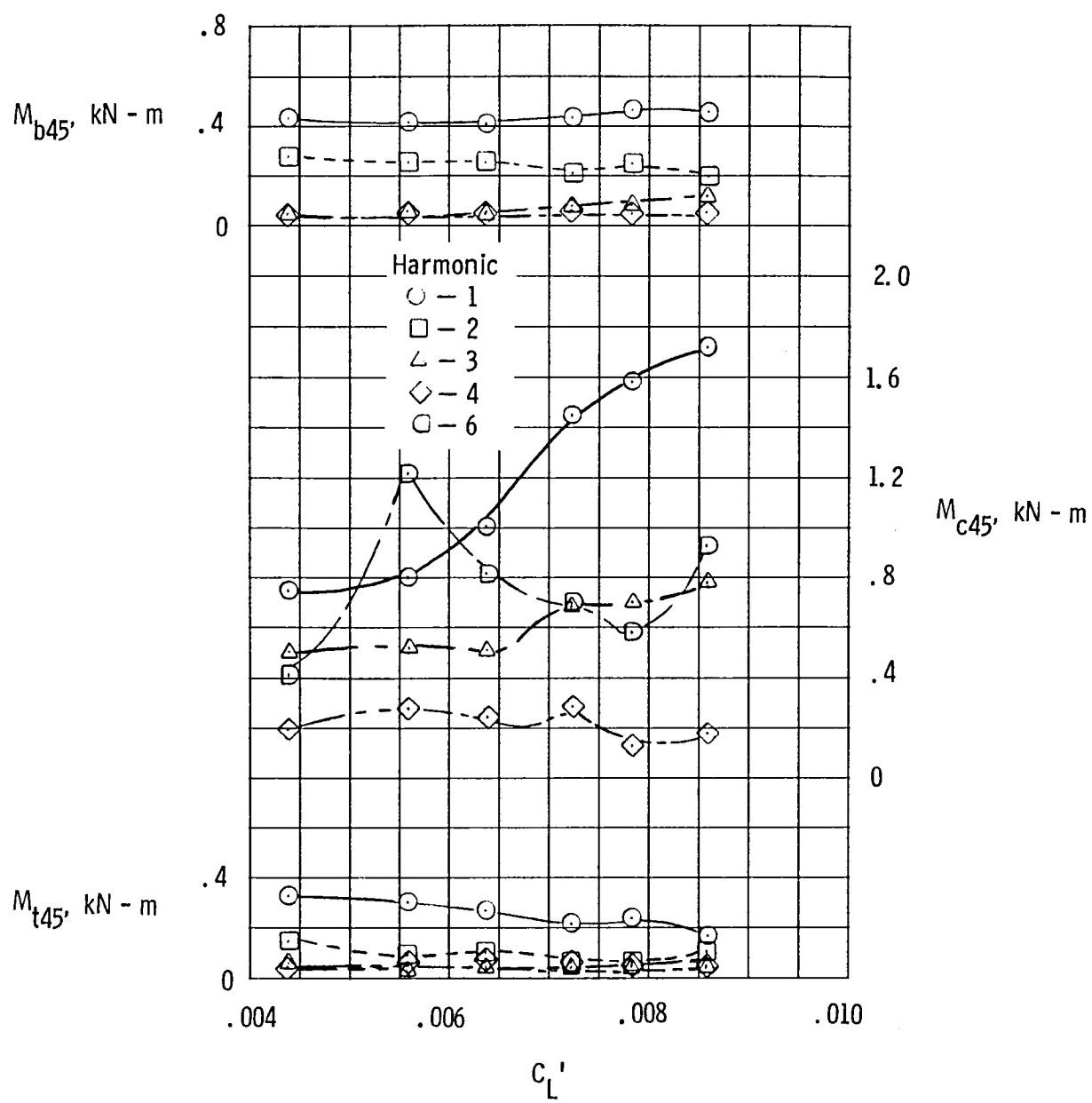
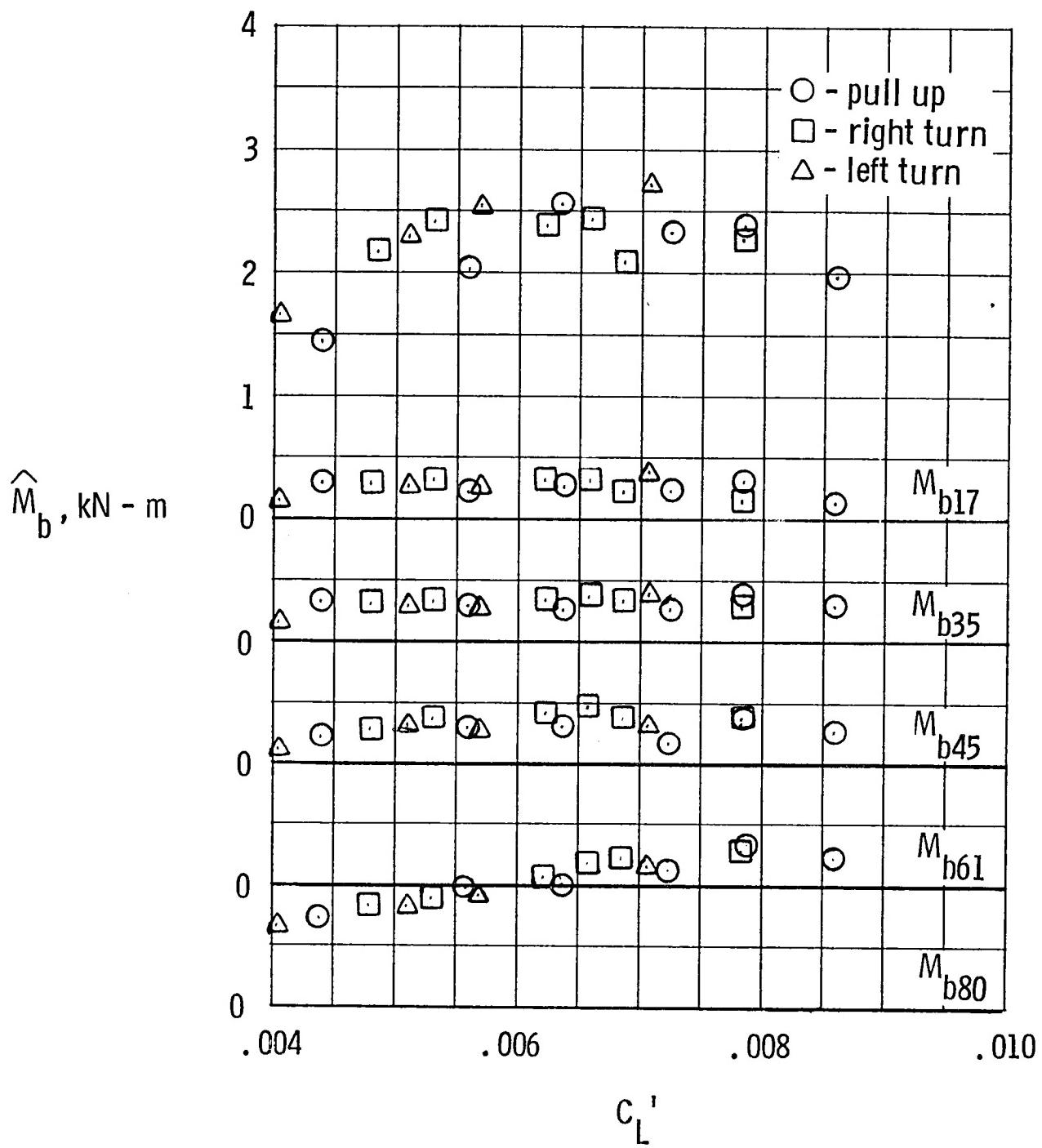
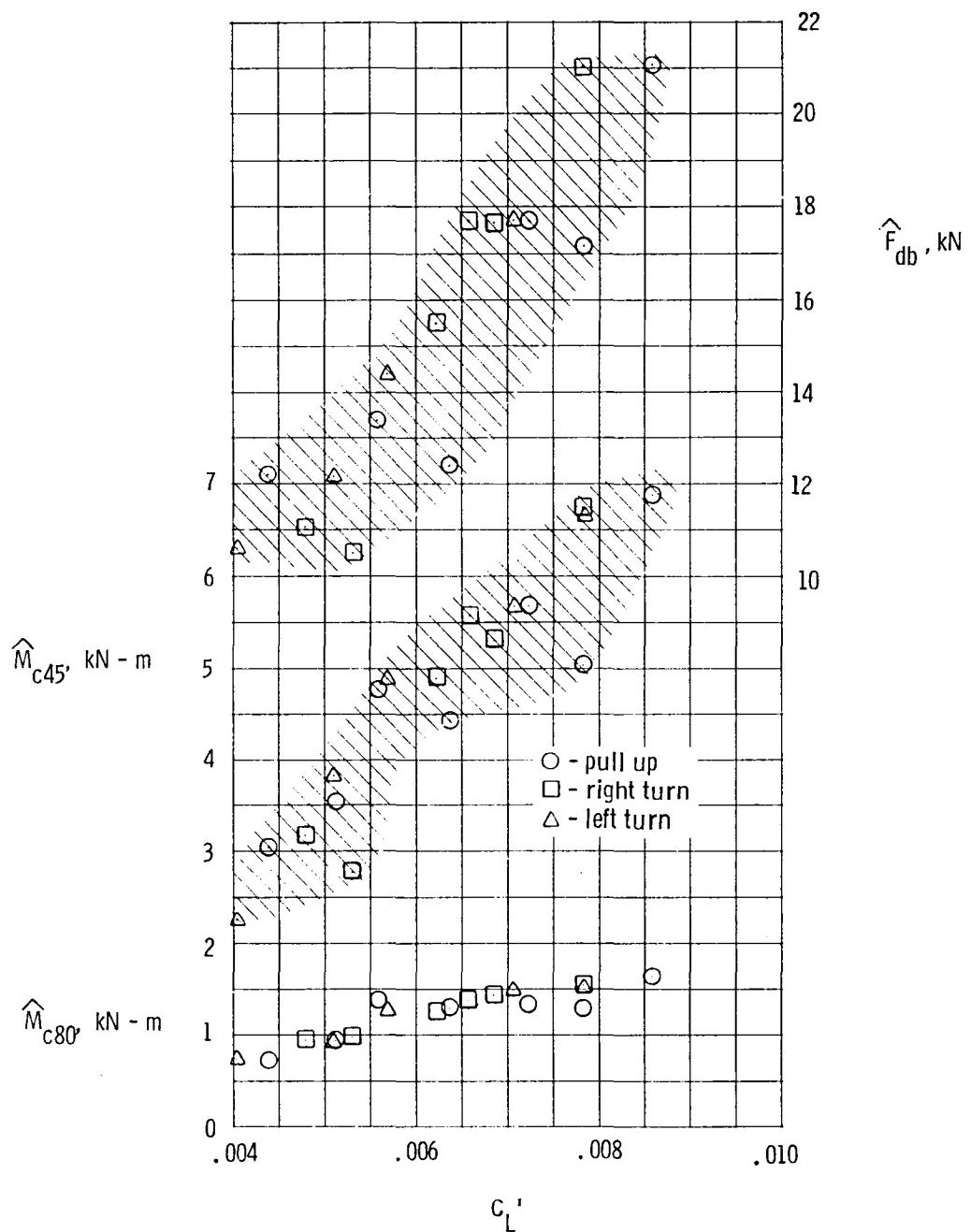


Figure 17. - Effect of vehicle load coefficient on primary harmonic-loads components for symmetrical pull-ups.  
 $\mu = 0.25$ .



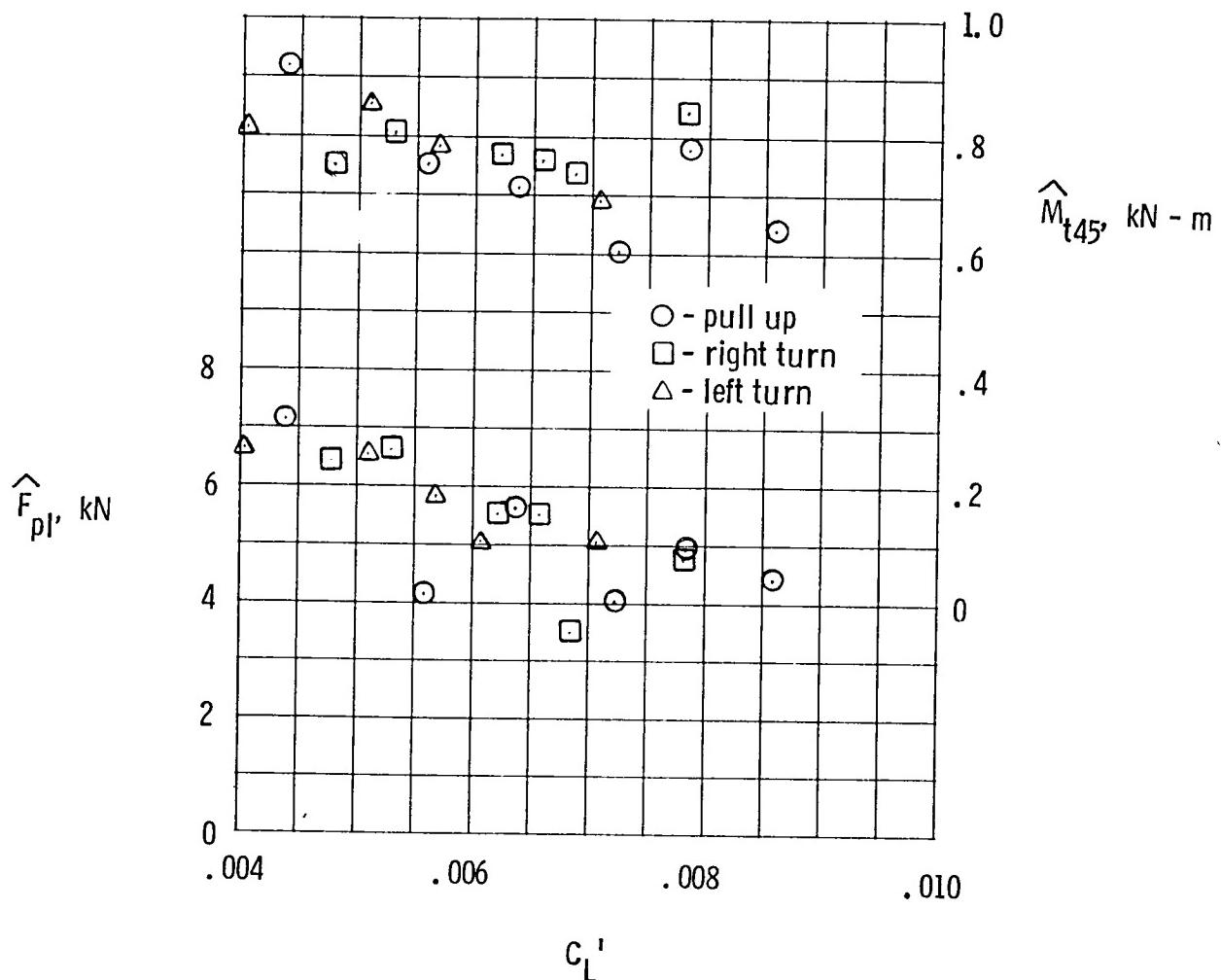
(a) Beamwise loads

Figure 18. - Effect of vehicle load coefficient on peak-to-peak loads for maneuvering flight.  $\bar{\mu} = 0.25$ .



(b) Chordwise loads

Figure 18. - Continued.



(c) Torsional loads

Figure 18. - Concluded.

1. Report No. AVRADCOM TM 80-B-2 NASA TM 81871	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle <b>A FLIGHT INVESTIGATION OF PERFORMANCE AND LOADS FOR A HELICOPTER WITH 10-64C MAIN-ROTOR BLADE SECTIONS</b>		5. Report Date <b>October 1980</b>	
		6. Performing Organization Code	
7. Author(s) <b>Charles E. K. Morris, Jr.; Robert L. Tomaine and Dariene D. Stevens</b>		8. Performing Organization Report No.	
9. Performing Organization Name and Address  NASA Langley Research Center and Structures Laboratory AVRADCOM Research and Technology Laboratories Hampton, Virginia 23665		10. Work Unit No. <b>533-01-43-01</b>	
		11. Contract or Grant No.	
12. Sponsoring Agency Name and Address  National Aeronautics and Space Administration Washington, DC 20546  and U.S. Army Aviation Research and Development Command St. Louis, MO 63166		13. Type of Report and Period Covered <b>Technical Memorandum</b>	
		14. Army Project No.	
15. Supplementary Notes <ul style="list-style-type: none"> <li>a. Charles E. K. Morris, Jr. and Dariene D. Stevens: Langley Research Center Robert L. Tomaine: Structures Laboratory, AVRADCOM Research and Technology Lab.</li> <li>b. Major contributors to this research at LaRC, NASA, were Messrs. M.A. Basnett, M. T. Baxter, P. L. Deal, J. A. Fernandez, P. R. Pfeffer, and L. B. McHenry of FLTMD and Messrs. J. F. Bryant, J. O. Riggins, F. S. Vassey, and W. A. Walls of FED.</li> </ul>			
16. ABSTRACT			
<p>A flight investigation has produced data on performance and rotor loads for a teetering-rotor, AH-1G helicopter flown with a main rotor that had the NLR-1T airfoil as the blade-section contour. The test envelope included hover, forward-flight speeds from 34 to 83 m/sec (65 to 162 knots), and collective-fixed maneuvers at about 0.25 tip-speed ratio. The data set for each test point describes vehicle flight state, control positions, rotor loads, power requirements, and blade motions.</p> <p>Rotor loads are reviewed primarily in terms of peak-to-peak and harmonic content. Lower frequency components predominated for most loads and generally increased with increased airspeed, but not necessarily with increased maneuver load factor.</p>			
<p>This report covers detailed data for an advanced airfoil on an AH-1G and is applicable for evaluating performance and airfoil analyses.</p>			
17. Key Words (Suggested by Author(s))  <b>Helicopter, Performance, Rotor loads, Teetering rotor</b>	18. Distribution Statement  <b>STAR CATEGORY 02</b>  <b>unclassified - unlimited</b>		
19. Security Classif. (of this report)  <b>Unclassified</b>	20. Security Classif. (of this page)  <b>Unclassified</b>	21. No. of Pages  <b>144</b>	22. Price*  <b>A07</b>





